

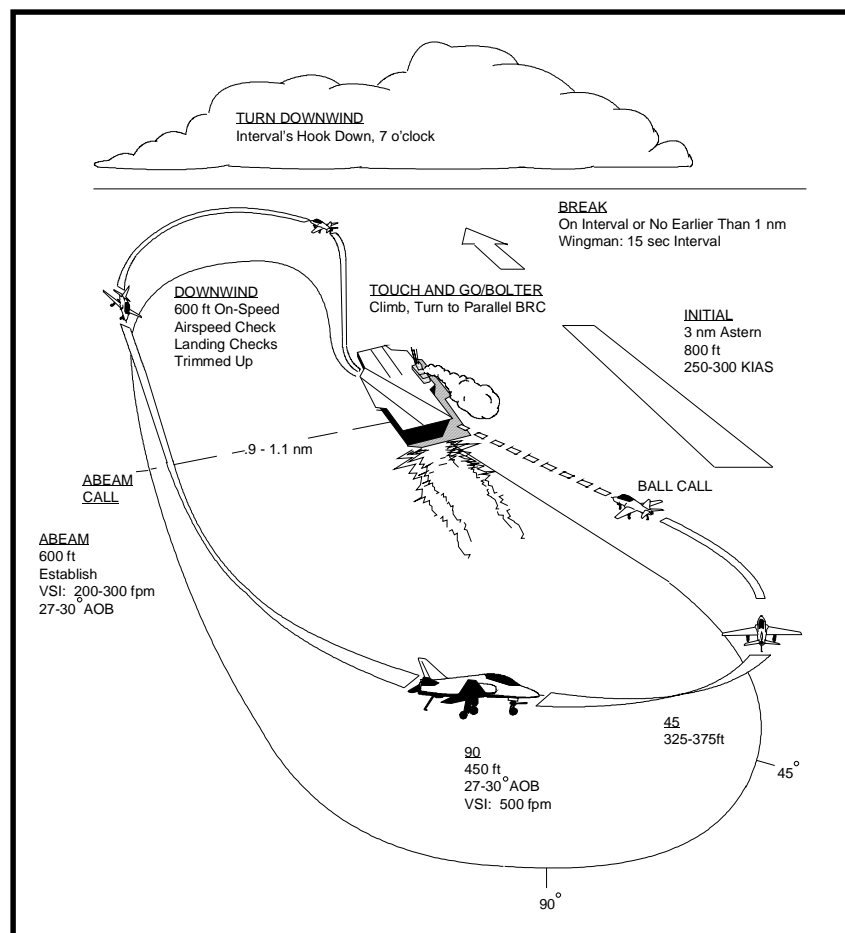
NAVAL AIR TRAINING COMMAND

NAS CORPUS CHRISTI, TEXAS

CNATRA P-1238 (REV. 7-01) PAT



CARRIER QUALIFICATION FLIGHT PROCEDURES



FLIGHT SUPPORT LECTURE GUIDE

2001

T-45 FLIGHT SUPPORT LECTURE GUIDE

CHANGE SUMMARY PAGE

CHANGE NUMBER	DATE ENTERED	CHANGE DESCRIPTION	INITIALS
1	6/27/02	Incorporated	TSC
2	7/30/03	Incorporated	TSC

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FLIGHT SUPPORT LECTURE GUIDE LIST OF EFFECTIVE PAGES

EFFECTIVE PAGES	PAGE NUMBERS	EFFECTIVE PAGES	PAGE NUMBERS
FRONT MATTER			
Change 2	i		
Original	ii		
Change 2	iii		
Original	iv		
TS, ADV & IUT			
CQFP-01			
Change 1	1-i		
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Original	1-1 thru 1-6		
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TS & ADV CQFP-02			
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TS & ADV CQFP-04			
Change 2	4-i thru 4-ii		
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Change 2	4-12 thru 4-13		
Original	4-14 thru 4-22		
TS & ADV CQFP-05; IUT CQFP-03			
Change 2	5-i thru 5-ii		
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Change 2	5-22		
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IUT CQFP-02			
Original	2-i thru 2-ii		
Original	2-1 thru 2-16		

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FLIGHT SUPPORT LECTURE GUIDE

COURSE/STAGE: [TS, ADV, & IUT / Carrier Qualification](#)

LESSON TITLE: Field Carrier Landing Practice (FCLP)

LESSON IDENTIFIER: [CQFP-01](#)

LEARNING ENVIRONMENT: Classroom

ALLOTTED LESSON TIME: 1.0 hr

TRAINING AIDS:

* [None](#)

STUDY RESOURCES:

- * [T-45 NATOPS Flight Manual](#), A1-T45AB-NFM-000 or [A1-T45AC-NFM-000](#)
- * [T-45](#) Carrier Qualification FTI

(7-01) CHANGE 1

I

LESSON PREPARATION:

Study

- * "Fresnel Lens Optical Landing System," "Field Carrier Landing Practice (FCLP)," and "Glossary of Terms," [T-45](#) Carrier Qualification FTI

REINFORCEMENT:

Review

- * Part III, "Normal Procedures," Part IV, "Flight Characteristics," and Part XI, "Performance Data," [T-45 NATOPS Flight Manual](#), A1-T45AB-NFM-000 or [A1-T45AC-NFM-000](#)

EXAMINATION:

The objectives in this lesson will be tested in [TS](#) & ADV CQFP-03X and IUT CQFP-04X.

LESSON OBJECTIVES**9.7.2.3.1.2**

Recall the operating characteristics of the Fresnel lens

9.2.1.1

Recall Landing Signal Officer (LSO) responsibilities

9.7.1.2.4.1

Recall the correct procedures/techniques in response to LSO commands during FCLP approach

9.7.1.1.1

Recall procedures/techniques for flying FCLP pattern

9.7.1.1.1.1

Diagram the FCLP pattern

9.7.2.3.7.1

Recall procedures/techniques for performing waveoff

9.7.1.5.1

Recall procedures for Delta pattern

9.7.1.2.1.1

Recall procedures/techniques for control of glideslope and airspeed during FCLP approach

9.7.1.2.3.1

Recall the procedures/techniques for controlling lineup on FCLP approach

9.7.1.4.1

Recall required communications for FCLP takeoff, approach, and landing

*Sg 0, fr 3***MOTIVATIONAL
VIDEO****MOTIVATION**

“Flying the ball” properly all the way down to an OK three-wire landing on the deck of an aircraft carrier is what separates Navy pilots from all other pilots. However, before you will be allowed to recover aboard an aircraft carrier, you will need to demonstrate safe and consistent landings during field carrier landing practice (FCLP). The pattern you will fly at the field is almost exactly the same as the one for the ship. Through repetition in the simulator and in the aircraft, you will establish a feel for properly correcting approach deviations and because your performance during FCLPs will normally mirror your performance at the ship, you want to do the best you can during FCLPs. Mastery of landings during FCLP will lead to an efficient transition to carrier landings, making your carrier qualification hops at the ship an enjoyable experience.

OVERVIEW

After this lesson, you will know the procedures for flying the FCLP pattern. You will also know the characteristics of the Fresnel lens system, techniques for controlling lineup in the groove, and LSO commands and responses.

This lesson covers the following topics:

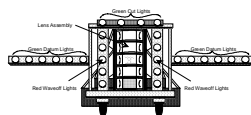
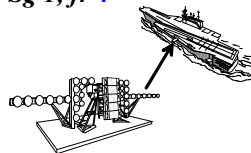
- * The Fresnel lens
- * Improved Fresnel Lens Optical Landing System (IFLOLS)
- * LSO commands
- * FCLP pattern procedures
- * Waveoff procedures
- * Delta procedures
- * Glideslope and airspeed corrections
- * Controlling lineup
- * Communications during FCLP takeoff, approach, and landing

REFRESHER

Recall that the FCLP pattern is identical to the basic Fam landing pattern but flown with a higher degree of precision necessary to land on a carrier.

*Sg 1, fr 2*FIELD CARRIER
LANDING
PRACTICE

- * **Fresnel Lens Optical Landing Aid System**
- * Improved Fresnel Lens Optical Landing System
- * Landing Signal Officer (LSO)
- * Flying the FCLP pattern
- * FCLP communications

Sg 1, fr 3FRESNEL LENS
(FIELD MODEL)*Sg 1, fr 4*FRESNEL LENS
(SHIP MODEL)**PRESENTATION**

I. Fresnel Lens Optical Landing Aid System (FLOLS)

9.7.2.3.1.2

- A. Purpose: electro-optical device to provide visual reference of optimum glideslope to pilots during carrier type landings
- B. Model description: two shipboard models and a portable shore-based model
 - 1. Mark 8, Mod 1: the shore-based model, nearly identical to shipboard variants

PRESS ENTER OR SELECT “MORE” FOR SHIP MODEL OF FRESNEL LENS

- 2. Mark 6, Mod 2: point and line stabilized—stabilizes glideslope indicator for both pitch and roll but not heave; used on most carriers
- 3. Mark 6, Mod 3: in addition to point and line stabilization, has a Carrier Landing Aid Stabilization System that corrects for ship heave
- C. Component description
 - 1. Lens assembly (source lights)
 - a. Description: lens box 1 ft wide by 4 ft high containing 5 vertical light cells, upper 4 lights amber and bottom light red
 - b. Function: indicate relative position on glideslope, i.e., above, on, or below optimum glideslope

2. Cut lights

- a. Description: 4 horizontally mounted green lights on top of lens box assembly
- b. Function: for jet and turboprop aircraft, indicates “Roger ball,” thereafter power. Utilized during “Ziplip,” EMCON, or NORDO at the ship (when radio calls not normally made)

3. Waveoff lights

- a. Description: 4 vertically mounted red lights on each side of top cell of lens box assembly

NOTE: There are 3 auxiliary waveoff lights on each side of and adjacent to the primary waveoff lights.
- b. Function: indicate LSO mandatory command to immediately wave off (flash on and off)

4. Datum lights

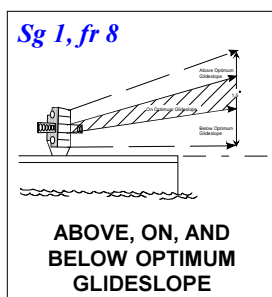
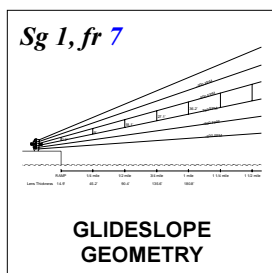
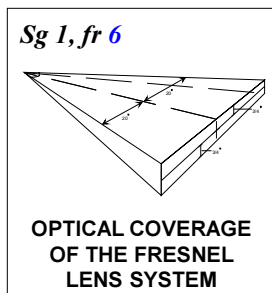
- a. Description: 6 horizontally mounted green lights on each side of lens box assembly adjacent to center lens—inside light is in same vertical plane as waveoff lights

NOTE: The 4 inside datum lights on each side are off when the waveoff lights are on.
- b. Function: provide pilot with ready reference as to aircraft position in respect to optimum glideslope shown on lens box assembly

Sg 1, fr 5

**VIDEO STILL -
close-up view of the
fresnel lens
onboard ship**

**FRESNEL LENS
(SHIP MODEL)**



D. Operation

1. Optical coverage

- Vertical plane: plus or minus 3/4-degree from optimum glideslope
- Horizontal plane: 40 degrees (20 degrees on either side of center)
- Only one cell is visible at any time

2. Glideslope geometry

- Cell thickness - the thickness of each cell decreases from 27 ft at 3/4 of a mile to 2.2 ft at the ramp
- Rates of descent - flying a constant "ball high" glideslope results in approximately 800-900 fpm VSI while a "ball low" results in a flatter 500-600 fpm VSI

3. Applications

- At the normal altitude for the 90-degree position (450 ft AGL), a deep 90-degree position will result in being long in the groove and subsequent low start (low ball or no ball—"Clara")
- At the normal altitude for the 90-degree position (450 ft AGL), a close 90-degree position will result in a short groove length and a high ball or "Clara" high start

NOTE: An improper 180-degree position will require adjustments in AOB and/or rate of descent to arrive at the proper position on glideslope and centerline.

II. Improved Fresnel Lens Optical Landing System (IFLOLS)

A. The IFLOLS is replacing the presently used FLOLS. The theory and operation of the FLOLS and IFLOLS are the same. Primary differences are:

1. The IFLOLS has 7 additional cells, for a total of 12. This allows for more exact glideslope information, and a higher definition visual aid which can be referenced out to 1.5 nm. The IFLOLS will appear to be much more "sensitive" due to its increased accuracy
2. The number of Datum Lights has increased to 10
3. The vertical coverage has been increased to 1.7 degrees vice the 1.5 of FLOLS
4. Acquisition range has been increased from 3/4 nm to 1-1/2 nm

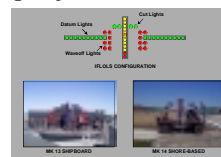
B. Due to present limited shipboard use IFLOLS, you will be briefed and FCLPped with a shore based IFLOLS, prior to CQ using IFLOLS

Sg 2, fr 2

FIELD CARRIER LANDING PRACTICE

- * Fresnel Lens Optical Landing Aid System
- * **Improved Fresnel Lens Optical Landing System**
- * Landing Signal Officer (LSO)
- * Flying the FCLP pattern
- * FCLP communications

Sg 2, fr 3



IFLOLS

*Sg 3, fr 2*FIELD CARRIER
LANDING
PRACTICE

- * Fresnel Lens
Optical Landing
Aid System
- * Improved Fresnel
Lens Optical
Landing System
- * **Landing Signal
Officer (LSO)**
- * Flying the FCLP
pattern
- * FCLP
communications

*Sg 3, fr 3*VIDEO STILL - LSO
ON DECK WITH AN
F-18 CATCHING
THE WIRE

LSO

III. Landing Signal Officer (LSO) 9.2.1.1

A. Responsibilities

1. Oversees safe and expeditious recovery of fixed-wing aircraft aboard ship
2. Trains pilots in carrier landing techniques by
 - a. Monitoring pilot performance
 - b. Scheduling and conducting necessary ground training
 - c. Counseling and debriefing individual pilots
 - d. Certifying carrier qualification

B. LSO Calls 9.7.1.2.4.1

1. Informative

NOTE: Informative calls are used to advise the pilot of existing situations. Remember that the LSO can see an aircraft trend developing before the pilot does.

- a. "You're [a little] high": adjust rate of descent immediately with power/nose attitude to reestablish center ball
- b. "You're [a little] low": adjust glideslope immediately with power/nose attitude to reestablish center ball
- c. "You're going high/low": adjust rate of descent with power/nose attitude to maintain center ball
- d. "Your lined up left/right": make lineup correction back to centerline
- e. "You're drifting left/right": stop drift and correct lineup back to centerline

- f. "You're fast/slow": adjust nose attitude/power to reestablish optimum AOA
- g. "Winds are [slightly] starboard/port/axial": monitor lineup to maintain centerline
- h. "You're under powered/over powered": adjust power and attitude as required
- i. "Ship's in a starboard/port turn": adjust lineup as necessary
- j. "You're wide abeam": use less AOB in approach turn and adjust rate of descent and altitude accordingly
- k. "You're close abeam": use more AOB in approach turn and adjust rate of descent and altitude accordingly
- l. "Deep 90": compensate by increasing pattern altitude
- m. "Close 90": compensate by decreasing pattern altitude
- n. "You're angling": correct lineup to centerline
- o. "You're overshooting": increase AOB to maximum allowable

2. Advisory

NOTE: Advisory calls are used to direct the pilot's attention to potential difficulties and prevent possible control errors.

- a. "Keep your turn in": increase AOB to prevent overshoot
- b. "Don't settle/Don't go low": adjust rate of descent and meatball to avoid settling below glideslope

- c. “Don’t climb” or “Don’t go high”: adjust power/attitude to stop the ball from rising
- d. “Don’t settle through it”: adjust rate of descent with power/nose attitude to intercept and maintain optimum glideslope
- e. “Easy with the power”: reduce magnitude of power/nose attitude correction to intercept and reestablish optimum glideslope and airspeed

3. Imperative

WARNING: Imperative calls are used to direct the pilot to execute a specific control action. Imperative calls are mandatory and require an immediate and correct response.

- a. “A little power”: correct with power
- b. “Power”: add power
- c. “Power back on”: add power to maintain optimum glideslope and AOA
- d. “Attitude” (“A little attitude”): increase nose attitude (slightly) to establish landing attitude
- e. “Right for lineup”: correct line up to centerline then level wings
- f. “Come left”: correct line up to centerline then level wings
- g. “Bolter”: power to MRT, retract speed brakes, and rotate nose attitude to establish optimum AOA and climb
- h. “Wave off,” or “Wave off, foul deck”: power to MRT, retract speed brakes, and maintain landing attitude. Fly up the landing area centerline. Turn to parallel the BRC at the bow

- i. “Wave off up the starboard side”: power to MRT, retract speed brakes, adjust nose attitude to maintain optimum AOA and climb, and fly up starboard side of the ship
- j. “Speed brakes”: retract speed brakes as appropriate
- k. “Climb”: adjust nose attitude to optimum AOA and maintain MRT to establish positive rate of climb (may follow a bolter or waveoff call)
- l. “Level your wings”: roll wings level
- m. “Drop your hook”: extend arresting hook
- n. “Drop your gear”: lower landing gear
- o. “Drop your flaps”: extend flaps/slats

Sg 3, fr 4

()	*	CD	DLW	⊙	LR
□	AP	CH	DN	⊙	LUL
○	AA	CO	DRW	⊙	LUR
⊙	ACC	COCO	EG	LIG	ND
A	AFU	CPD	F	LLU	NEA
M	B	CU	FD	LL	NELR
PD	C	DEC	GLI	LO	NEP
I	CB	DFD	H	L-R	NERD

**LSO GRADING
SYMBOLGY****Sg 3, fr 5**

NERR	PNU	SRD	TWA	X
NESA	ROT	ST	↔	IM
NH	RUF	TCA	••	IC
NLU	R-L	TMA	↗	AR
NSU	S	TMRD	✕	TL
OS	SD	TTL	✕	IW
OSCB	SHT	TTM	IT	OW
P	SLO	TTS	OT	AW

**LSO GRADING
SYMBOLGY**

C. Grading passes: each pass flown during FCLPs and at the ship is graded by an LSO on a 0-to-5 point scale along with appropriate comments

1. OK 5 Perfect pass
2. OK 4 Reasonable deviations with good corrections
3. (OK) 3 Fair pass, reasonable deviations
4. B [↗] 2.5 Bolter
5. “—” 2 No grade, below average but safe pass
6. PWO 2 Pattern waveoff
7. WO 1 Waveoff, aircraft not set up properly for a safe approach (technique)
8. —C→ 0 Cut pass, unsafe, gross deviations inside waveoff window
9. TWO NC test waveoff, practiced during FCLPs to demonstrate proper waveoff technique
10. OWO NC Own waveoff, executed when clearance to land via Roger Ball or cut lights are not received
11. WOFD NC Waveoff—foul deck
12. NC NC No count (used in grade column)

D. Example of CQ grade sheet

This projected image is an example of a typical CQ period

Sg 3, fr 6

DATE		TIME		WEATHER	
DAY	MONTH	YEAR	TIME	SEA	WIND
AC	AB	AA	AA	AA	AA
COMMENTS					
1	2	3	4	5	6
1	2	3	4	5	6
1	2	3	4	5	6
1	2	3	4	5	6
1	2	3	4	5	6
1	2	3	4	5	6
1	2	3	4	5	6
1	2	3	4	5	6
1	2	3	4	5	6

CQ GRADE SHEET**Sg 3, fr 6, p1 and p2**

**PILOT
PERFORMANCE
RECORD
LSO SYMBOLS**

IV. Flying the FCLP pattern 9.7.1.1.1

A. FCLP pattern procedures 9.7.1.1.1.1

1. Pattern entry

- a. Fly at 250-300 KIAS at appropriate initial altitude
- b. Communicate to controlling agency (tower/LSO): "Tower: **callsign**, initial."

NOTE: The tower may direct aircraft to switch to the "Paddles Frequency" prior to the break or once established downwind. Often you will check-in on paddles frequency on deck and launch directly into the pattern under his control.

2. Break

- a. Execute **a** level **15 unit** break at 250-300 KIAS at 800 ft AGL when cleared or directed by tower

(1) Roll into approximately 70-80 degrees AOB

(2) Reduce power to IDLE

(3) Extend speed brakes

(4) Utilize Optimum AOA in Break

- b. Lower landing gear and full flaps/slats below 200 KIAS

3. Downwind

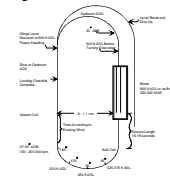
- a. **Descend** to 600 ft AGL when wings level
- b. Trim for on-speed
- c. Verify AOA/airspeed (cross-check)

Sg 4, fr 2

FIELD CARRIER LANDING PRACTICE

- * Fresnel Lens Optical Landing Aid System
- * Improved Fresnel Lens Optical Landing System
- * Landing Signal Officer (LSO)
- * **Flying the FCLP pattern**
- * FCLP communications

Sg 4, fr 3



FCLP PATTERN

- d. Establish optimum AOA
- e. Complete landing checklist prior to abeam

4. Abeam position

- a. Verify proper distance abeam (.9-1.1 nm laterally)
- b. Maintain proper interval
- c. Maintain 600 ft AGL
- d. Maintain reciprocal or R/W heading +/- crab necessary to compensate for wind
- e. Communicate to LSO (first pass only): side number, abeam, gear, flaps, "on speed" KIAS, fuel state, and qual number, "Bravo four zero zero, abeam, gear, flaps, on-speed, one two one, two point four, Golf one two."
- f. Abeam call after first pass: "Golf one two, abeam"

NOTE: Do not transmit abeam call when another aircraft is "on the ball."

NOTE: Precise control of altitude and airspeed at the abeam position is essential to achieving consistent starts.

- g. Continue from abeam at 600 ft AGL and on-speed

5. 180-degree position

NOTE: The proper 180-degree position is 15 seconds past abeam, -1 second for each knot of headwind. The LSO will keep the pattern informed accordingly.

- a. Roll into 27-30 degrees AOB and adjust power and nose attitude slightly to set up a 200-300 fpm rate of descent

NOTE: Being too wide abeam at the 180-degree position will result in less AOB necessary to arrive at a correct 90-degree position, while being too close at the 180-degree position will require a maximum AOB (30 degrees) to arrive at a correct 90-degree position and not overshoot. Rate of descent off the 180-degree position must also be adjusted accordingly in order to arrive at the proper 90-degree position and acquire the ball at the 45-degree position.

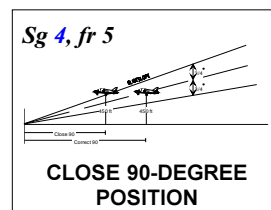
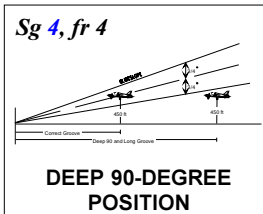
- b. Scan from the 180 to the 90 is primarily an instrument scan
- c. Maintain optimum AOA

6. 90-degree position

- a. Maintain optimum AOA
- b. Pass through 90 degrees at 450 ft AGL

NOTE: Adjust your altitude at the 90-degree position if you are too close (tight) or too deep. If you are too close at the 90-degree position, 450 ft AGL will result in a high start. If you are too deep at the 90-degree position, 450 ft AGL will result in a low start.

- c. Increase rate of descent to a steady 500 fpm to arrive at the 45-degree position at the proper altitude



d. Adjust AOB as necessary so as not to overshoot or undershoot extended runway centerline

e. The scan from the 90 to the 45 is a transitional one from instrument to visual

7. 45-degree position

a. Pass through 45-degree position at 325-375 ft AGL and optimum AOA (should start picking up the ball at this point)

b. Acquire the ball

NOTE: From the 45-degree position to the start position, fly the aircraft on-speed with a steady rate of descent so as to roll wings level in the groove on the extended centerline of the carrier box with a centered ball and a rate of descent of approximately 500 fpm.

COMMON ERROR: A poor instrument scan will cause inconsistent patterns, resulting in poor starts.

8. Start

a. Arrive at the start with a centered ball, on carrier box centerline, on speed, with 500 fpm rate of descent and power setting to maintain that rate of descent

NOTE: If the meatball is not acquired by the start, a "Clara" call will be made.

9. Groove

a. Call the ball: side number, Goshawk, ball, fuel state, qual number—"Four zero zero, Goshawk, ball, two point two, Golf two."

NOTE: Do not transmit ball call if the aircraft ahead of you is on the ball or just touching down.

WARNING: Never descend below 300 ft AGL without the ball.

b. Scan

- (1) Meatball - scan across the tops of the datums

NOTE: Do not stare at the ball.

- (2) Lineup - from the datums to centerline, and then back across the datums

- (3) AOA - maintain AOA by scanning indexer with peripheral vision

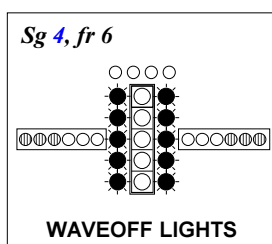
10. Touchdown

- a. With centered ball
- b. On centerline of carrier box
- c. On-speed

COMMON ERROR: Dropping the nose to land is commonly caused by attempting to recenter a rising ball in close.

COMMON ERROR: Holding off is commonly caused by reducing power or carrying insufficient power during the latter portion of the approach and attempting to correct the resulting "settle" by pulling back on the stick.

COMMON ERROR: Attempting to take a "cut" at the ramp for a "high" or a "climb in close" results in excessive sink rates and long deck rolls.



11. Upon touchdown

- a. Simultaneously advance power to MRT, retract speed brakes, rotate to proper nose attitude (10-12 degrees noseup), and climb at optimum AOA
- b. Start turn to downwind at 300 ft AGL, with interval at 10 o'clock

B. Waveoff 9.7.2.3.7.1

1. Initiation: either by verbal waveoff command by LSO or tower or red flashing waveoff lights on lens or both

NOTE: In the CQ stage, do not initiate your own waveoff except in an emergency or if you have not received a "Roger ball" by the in-the-middle position.

2. Procedure

- a. Advance power to MRT while simultaneously retracting speed brakes and rotating to stop the rate of descent

- b. Maintain **landing attitude** and climb

- c. Accelerate to pattern airspeed

NOTE: Do not take your own waveoff "in close." The waveoff will normally be taken straight ahead or as directed by the LSO.

- d. Turn downwind

(1) +300 ft AGL

(2) Interval at 10 o'clock

while turning and in climb

(3) Maintain 130 KIAS or on-speed AOA or whichever is greater

(4) Maintain 30-degree AOB

C. Delta procedures **9.7.1.5.1**

1. Purpose: to put aircraft into holding pattern when deck/runway becomes fouled or unusable

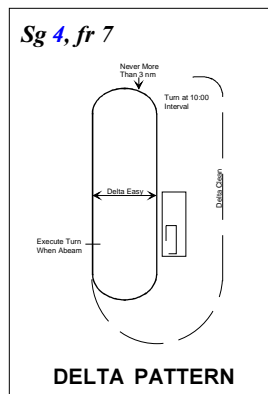
2. Procedures

a. Delta Easy

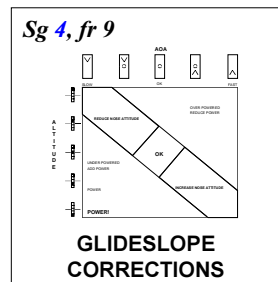
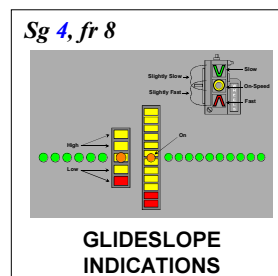
- (1) All aircraft in pattern remain in dirty configuration with speed brakes retracted and climb to pattern altitude (or as directed by LSO)
- (2) Fly normal racetrack pattern offset to left-hand side of runway while maintaining proper interval on aircraft ahead
- (3) When cleared out of Delta Easy, first aircraft to reach 180-position resumes landing pattern

b. Delta Clean

- (1) If already in pattern
 - (a) Clean up aircraft
 - (b) Accelerate to 200 KIAS
 - (c) Climb to 2,000 ft MSL (or as directed by LSO)
 - (d) Fly normal racetrack pattern, offset to left-hand side of runway while maintaining 10 o'clock interval on aircraft ahead
 - (e) Remain within 3 nm of field



- (2) Upon arrival at field
 - (a) Enter initial IAW local course rules
 - (b) Maintain 200 KIAS
 - (c) Proceed to overhead duty runway and take interval on aircraft already in Delta
 - (d) Fly normal racetrack pattern offset to left-hand side of runway while maintaining proper interval
 - (e) All aircraft should remain within 3 nm of field
- (3) When cleared out of Delta Clean
 - (a) Cleared out of Delta pattern by Charlie call
 - (b) First aircraft abeam departs Delta pattern to arrive at the initial with wings level at 250 KIAS and at initial altitude for the break
 - (c) Other aircraft follow in order while maintaining interval



D. Glideslope and airspeed corrective actions 9.7.1.2.1.1

1. Depending on glideslope position and angle-of-attack, different corrections are required to maintain desired parameters
2. The correction matrix shows the basic adjustments required to regain "on-glideslope/on-speed" parameters

3. High and on-speed: Reduce power to increase rate of descent and adjust nose attitude to maintain optimum AOA. As the ball begins to move toward center, add enough power to reestablish and maintain proper glideslope and readjust nose attitude to maintain optimum AOA. If the ball goes high in close or at the ramp, stop the movement but do not attempt to recenter the ball

LECTURE NOTES

Emphasize that attempting to recenter a high ball in close may result in too steep a descent or overcontrolling the aircraft, resulting in a low ball, early touchdown, and the possibility of hitting the ramp at the ship.

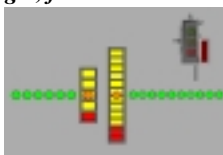
4. Fast and on glideslope: Reduce power. As the aircraft decelerates, increase nose attitude to maintain a centered ball. Approaching optimum AOA, readjust power as necessary to maintain AOA and glideslope
5. Slightly fast and on glideslope: As appropriate, reduce power and increase nose attitude to maintain a centered ball. As the aircraft decelerates and approaches optimum AOA, readjust nose attitude and power as necessary to maintain AOA and glideslope
6. High and fast: Correct for a high and fast as you would for a high. A larger power reduction is required. Reduce power to increase rate of descent and adjust nose attitude to intercept the glideslope. When on glideslope, allow aircraft to decelerate to on-speed and then readjust power to maintain on glideslope and on-speed. Always correct for glideslope first, then decelerate to optimum AOA

Sg 4, fr 10



HIGH AND ON-SPEED

Sg 4, fr 11



FAST AND ON
GLIDESLOPE

Sg 4, fr 12



SLIGHTLY FAST AND
ON GLIDESLOPE

Sg 4, fr 13



HIGH AND FAST

Sg 4, fr 14



LOW AND ON-SPEED

7. Low and on-speed: Add power and adjust nose attitude to maintain optimum AOA. Once the ball is centered, reduce power to reestablish glideslope and readjust nose attitude to maintain optimum AOA. Never accept a low ball

LECTURE NOTES

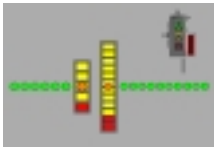
Emphasize that a low ball should never be accepted. A low call can result in an early touchdown and the possibility of hitting the ramp at the ship. If the ball goes low, the SNP must make an immediate correction.

Sg 4, fr 15

SLOW AND ON
GLIDESLOPE

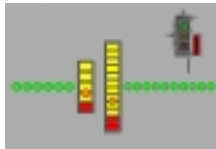
8. Slow and on glideslope: Add power. As aircraft accelerates, decrease nose attitude to maintain a centered ball until optimum AOA is reached. Then readjust attitude and power as necessary to maintain AOA and glideslope

Sg 4, fr 16

SLIGHTLY SLOW AND
ON GLIDESLOPE

9. Slightly slow and on glideslope: Add a little power as appropriate and adjust nose to maintain optimum AOA. As the aircraft accelerates and reaches optimum AOA, readjust the nose and power as necessary to maintain AOA and glideslope

Sg 4, fr 17



LOW AND SLOW

10. Low and slow: An unsafe condition: Do not delay the correction. Add power and maintain nose attitude until the ball is centered. Further corrections are the same as for a slow. Always correct for glideslope first

Sg 4, fr 18



HIGH AND SLOW

11. High and slow: If the aircraft is not excessively slow, you may need only to lower nose attitude to correct. However, you may have to add power to correct for the slow. If you accelerate to on-speed before the ball approaches the center, then a small power reduction will be required

12. Low and fast: First, correct by only increasing nose attitude. Further correction will depend on the AOA and ball position

E. Controlling lineup on approach 9.7.1.2.3.1

1. Roll out on extended centerline of carrier box
2. Scan carrier box centerline for correct lineup
3. If not lined up upon rolling out in groove, make an immediate lineup correction
4. Be aware of winds. Correct for crosswind using wings level, crabbed technique to maintain lineup in groove

NOTE: For every lineup correction, a counter correction will be required as you approach the centerline. Chasing lineup will cause glideslope errors to follow.

COMMON ERROR: Angling or overshooting the approach is commonly caused by improper crosswind correction in the pattern or an improper abeam distance.

COMMON ERROR: Poor glideslope control at this point is commonly caused by the pilot's inability to properly anticipate required power corrections.

COMMON ERROR: Dropping the nose to land is commonly caused by attempting to recenter a rising ball in close.

COMMON ERROR: Holding off is commonly caused by reducing power or carrying insufficient power during the latter portion of the approach and attempting to correct the resulting “settle” by pulling back on the stick.

COMMON ERROR: Attempting to take a “cut” at the ramp for a “high” or a “climb in close” results in excessive sink rates and long deck rolls.

Sg 4, fr 19



LOW AND FAST

Sg 4, fr 20

DATE		TIME		WEATHER		
DAY		DECK STATE		SHIP		
MIGHT		STEADY		W/5'S FELD		
41	NO	CAUSE	COMMENTS	WHY	WHY	
1		PWID	TEA 0205	W/5 STEED 0600	—	SCOUTER
2		15 th	TEA HAA THP R-16 BE-AR	20 th	—	SCOUTER
3		—	SLIMMER RPT. CURZEN 3RD 0600	T-4	—	SCOUTER
4		1000	AREA COLLECTOR 15 th W/5 0600	3	—	SCOUTER
5		—	W/5027 (W/5027) (W/5027) V-60	2	—	BUNNY
6		W/5027	L-10 SPEED & RHP COM.	—	—	SCOUTER
7		—	HEAVY EIGHT	3	—	B-1015

CQ GRADE SHEET

Sg 5, fr 2

FIELD CARRIER
LANDING
PRACTICE

- * Fresnel Lens Optical Landing Aid System
- * Improved Fresnel Lens Optical Landing System
- * Landing Signal Officer (LSO)
- * Flying the FCLP pattern
- * **FCLP communications**

V. FCLP communications **9.7.1.4.1**

A. Holdshort (to request takeoff into FCLP pattern):

1. Side number, aircraft status, fuel state, student qual number

B. Pattern entry

1. Depart & reenter
2. Direct entry

C. Abeam (abeam call to LSO on first pass only)

1. Side number, aircraft location, gear is down and locked, flaps/slats down, state on or off speed, fuel state (2.4 = 2,400 lb), student qual number
2. Abeam call after first pass: "Golf one two, abeam."

D. Call the ball rolling into the groove (to report acquiring ball): "Two zero zero, Goshawk, ball, two point two, Golf one two."

1. Side number, type aircraft, "ball", fuel state, student qual number
2. If meatball is not in sight after you roll into groove, immediately call "Clara"

NOTE: If "Clara" is called, the LSO will respond with "You're high" or "You're low." Once you have acquired the ball, report "Ball."

CAUTION: Do not descend below 300 ft AGL without acquiring the ball.

E. Low visibility/management FCLP calls

1. Crosswind
2. Turning in

F. Radio difficulties in the pattern

1. If receiver operates but not transmitter, pattern may be worked at LSO's discretion
2. If receiver failure occurs when in the pattern, rock your wings at the "ball" call and expect to do full-stop landing on the next pass
3. Momentary cut lights (3 seconds) on the ball the first time signal "roger ball." Subsequent momentary illumination of the cut lights means "add power"
4. If alternating cut and waveoff lights flash, proceed to prebriefed divert field

NOTE: Full stop if bouncing at that prebriefed divert field.

5. In all radio emergencies, aviate, navigate, communicate

*Sg 6, fr 2***FIELD CARRIER
LANDING PRACTICE
REVIEW OPTIONS**

1. Entire lesson
2. Fresnel Lens
Optical Landing
Aid System
3. Improved Fresnel
Lens Optical
Landing System
4. Landing Signal
Officer (LSO)
5. Flying the FCLP
pattern
6. End this lesson

Please select

SUMMARY

This lesson covered the following topics:

- * The Fresnel lens
- * Improved Fresnel Lens Optical Landing System (IFLOLS)
- * LSO commands
- * FCLP pattern procedures
- * Waveoff procedures
- * Delta procedures
- * Glideslope and airspeed corrections
- * Controlling lineup
- * Communications during FCLP takeoff, approach, and landing

CONCLUSION

The FCLP pattern you fly at the field is similar to the pattern flown at the ship, but the forward movement of the ship, the height of the deck above the water, the deck angle, and the lack of ground effect tend to make a noticeable difference. However, flying the proper pattern as practiced during FCLPs and in the simulator and knowing procedures cold will help you easily overcome these carrier differences.

FLIGHT SUPPORT LECTURE GUIDE

COURSE/STAGE: [TS & ADV / Carrier Qualification](#)

LESSON TITLE: Night FCLP Procedures

LESSON IDENTIFIER: [CQFP-02](#)

LEARNING ENVIRONMENT: Classroom

ALLOTTED LESSON TIME: .5 hr

TRAINING AIDS:

- * [None](#)

STUDY RESOURCES:

- * [T-45 NATOPS Flight Manual](#), A1-T45AB-NFM-000 or [A1-T45AC-NFM-000](#)
- * [T-45](#) Carrier Qualification FTI

(7-01) ORIGINAL

LESSON PREPARATION:

Study:

- * "Field Carrier Landing Practice (FCLP)," [T-45](#) Carrier Qualification FTI, noting especially the section on night FCLP

REINFORCEMENT:

Review:

- * Part III, "Normal Procedures," Part IV, "Flight Characteristics," and Part XI, "Performance Data," [T-45 NATOPS Flight Manual](#), A1-T45AB-NFM-000 or [A1-T45AC-NFM-000](#)

EXAMINATION:

The objectives in this lesson will be tested in [TS & ADV CQFP-03X](#).

LESSON OBJECTIVES**9.7.1.1.2**

Recall night FCLP lighting

9.7.1.1.3

Recall procedures for night FCLP

9.7.1.2.3.2

Receive the procedures/techniques for controlling lineup on night FCLP approach

9.7.1.4.2

Recall required communications for night FCLP takeoff, approach, and landing

*Sg 0, fr 3***MOTIVATIONAL
VIDEO****MOTIVATION**

As you know, there is a significant difference between day and night flying. At night during FCLP, you will not have reference to the horizon and other peripheral cues that you were able to use during the day. Even though you will not be doing night landings on the carrier before you are assigned to the Fleet Replacement Squadron (FRS), the additional practice you get performing night FCLPs now will enhance your instrument scan.

OVERVIEW

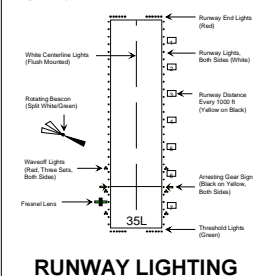
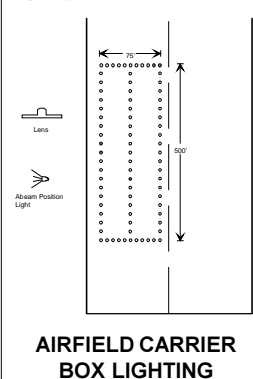
After this lesson, you will know the procedures for flying the night FCLP pattern, approach, landing, and communicating.

This lesson covers the following topics:

- * Night FCLP lighting
- * Night FCLP pattern
- * Night FCLP differences
- * Radio difficulties in the pattern

*Sg 1, fr 2***NIGHT FCLP
QUALIFICATION**

- * **Night FCLP lighting**
- * Flying night FCLP
- * Night FCLP differences
- * Radio difficulties in the pattern

Sg 1, fr 3*Sg 1, fr 4***PRESENTATION****I. Night FCLP lighting 9.7.1.1.2**

- A. Normal field lighting: same as for night familiarization except that the wheels watch high intensity light is extinguished
- B. Night FCLP (carrier box) lighting
 1. Permanent field carrier deck resembles actual flight deck lighting
 2. Abeam position marked by red light placed abeam the intended point of landing

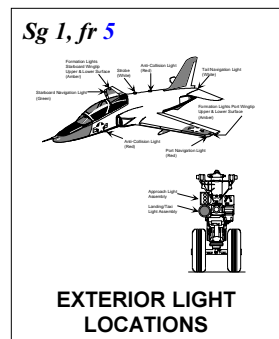
C. Aircraft lighting: similar to night familiarization except for the following

1. Exterior pre-start checks

- a. NAV lights--BRIGHT
- b. Anti-collision lights--the bottom anti-collision light is automatically turned off when the gear is down and locked
- c. Formation lights--ON
- d. Approach lights--operable

NOTE: Aircraft will not be allowed in the night FCLP without operating approach lights.

- e. Strobe light--secured
2. Observe normal light management during taxi
 3. When entering the holdshort, secure anti-collision and strobe lights OFF (as briefed by LSO)
 4. Ensure anti-collision light is on before taking the duty

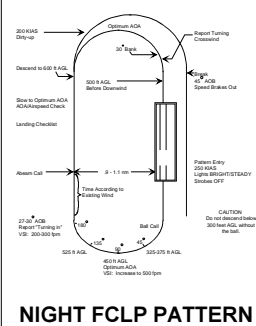


Sg 2, fr 2

NIGHT FCLP QUALIFICATION

- * Night FCLP lighting
- * **Flying night FCLP**
- * Night FCLP differences
- * Radio difficulties in the pattern

Sg2, fr 3



Sg 2, fr 4

2 VIDEO STILLS -
AIRFIELD CARRIER
BOX LIGHTING
FROM THE
"ABEAM" POSITION

NIGHT FCLP ABEAM

Sg 2, fr 5

A FULL MOTION
IN-THE-GROOVE
VIEW

IN-THE-GROOVE

II. Flying night FCLP 9.7.1.1.3

A. Pattern entry

1. Communicate to controlling agency (tower): "Tower: Four zero zero, initial."
2. Enter at 250 KIAS at normal break altitude
3. Switch to paddles frequency as per course rules or as directed

B. Pattern entry from takeoff or reentry from waveoff or touch-and-go

1. Remain runway heading until cleared to turn crosswind by tower or LSO
2. Do not turn crosswind until at or above 500 ft AGL
3. Call turning "Crosswind"

C. From this point, procedures are similar to day FCLP, except

1. Due to absence of visual cues, a strong instrument scan is essential
2. Do not descend below 300 ft AGL without acquiring ball
3. Perform all full-stop landings in the carrier box or as directed by LSO

COMMON ERRORS: Common errors are essentially the same as for day FCLP. However, because you have fewer visual references at night, a good instrument scan in the pattern is paramount.

III. Night FCLP differences **9.7.1.2.3.2**

- A. Lack of visual cues
- B. Solid pattern required
- C. Carrier box visible at the 90
- D. Lineup procedures same as day FCLP except that detecting lineup drift is more difficult because centerline is so short

Sg 3, fr 2

NIGHT FCLP QUALIFICATION

* Night FCLP lighting

* Flying night FCLP

* **Night FCLP differences**

* Radio difficulties in
the pattern

Sg 4, fr 2

NIGHT FCLP
QUALIFICATION

- * Night FCLP lighting
- * Flying night FCLP
- * Night FCLP differences
- * **Radio difficulties in the pattern**

IV. Radio difficulties in the pattern 9.7.1.4.2

- A. NORDO conditions will be signaled by turning exterior lights to BRIGHT/FLASH
- B. Turning the taxi light on signals the LSO that you are making an arrested landing
- C. If LSO NORDO, the tower will take control of pattern
- D. Flashing the taxi light signals a full stop

SUMMARY

This lesson covered the following topics:

- * Night FCLP lighting
- * Night FCLP pattern
- * Night FCLP differences
- * Radio difficulties in the pattern

CONCLUSION

Remember, although your performance during night FCLPs may not necessarily parallel your performance at the ship, many deviations/responses during night FCLPs are mirrored at the ship. Mastery of night FCLPs will enhance your instrument scan and increase your precision during actual carrier quals.

Sg 5, fr 2

**NIGHT FCLP
QUALIFICATIONS
REVIEW OPTIONS**

1. Entire lesson
2. Night FCLP lighting
3. Flying night FCLP
4. End this lesson

Please select

NOTES

FLIGHT SUPPORT LECTURE GUIDE

COURSE/STAGE: Carrier Qualification

LESSON TITLE: Carrier Qualification Shipboard Procedures

LESSON IDENTIFIER: CQFP-04

LEARNING ENVIRONMENT: Classroom

ALLOTTED LESSON TIME: 1.0 hr

TRAINING AIDS:

- * None

STUDY RESOURCES:

- * T-45 NATOPS Flight Manual, A1-T45AB-NFM-000 or A1-T45AC-NFM-000
- * CV NATOPS Manual
- * LSO NATOPS Manual, NAVAIR 00-80T-104
- * T-45 Carrier Qualification FTI

LESSON PREPARATION:

Study:

- * Section IV, "Launching Aircraft," and Section V, "Recovering Aircraft," CV NATOPS Manual
- * "Carrier Qualification," and "Flight Deck Procedures," T-45 Carrier Qualification FTI

(7-01) CHANGE 2

I

REINFORCEMENT:

Review:

- * Chapter 8, "Carrier-Based Procedures," T-45 NATOPS Flight Manual, A1-T45AB-NFM-000 or A1-T45AC-NFM-000
- * Section IV, "Launching Aircraft," and Section V, "Recovering Aircraft," CV NATOPS Manual
- * Chapter 6, "Shipboard Procedures," LSO NATOPS Manual, NAVAIR 00-80T-104

EXAMINATION:

The objectives in this lesson will be tested in UJPT, E2-C2, & ADV CQFP-06X.

LESSON OBJECTIVES**9.7.2.6.1.1**

Recall procedures/techniques for CV pattern entry

9.7.2.2.1

Recall procedures/techniques for the carrier pattern

9.7.2.1.1.1

Interpret marshal procedures (Case I)

9.7.2.1.1.2

Interpret marshal procedures (Case II)

9.7.2.2.2

Recall carrier pattern/landing procedures

9.7.2.2.3

Recall carrier pattern break and turn downwind procedures at CV

9.7.2.3.5

Recall procedures/techniques for approach turn to CV

9.7.2.3.1.1

Recall procedures/techniques for controlling glideslope/airspeed on carrier approach

9.7.2.3.4.1

Recall procedures/techniques in response to LSO calls during carrier approach

9.7.2.3.5.1.1

Recall procedures/techniques for performing touch and go and bolter

9.7.2.3.7.1

Recall procedures/techniques for performing a waveoff

9.7.1.5.1

Recall procedures for Delta pattern

9.7.2.3.8.1

Recall procedures/techniques for arrested landings

LESSON OBJECTIVES (Cont.)**9.7.2.4.1.1**

Recall after CV arrestment procedures

9.7.2.4.2.1

Recall procedures/techniques for taxiing aircraft on flight deck

9.7.2.5.1.1

Recall procedures for catapult hookup

9.7.2.5.2.1

Recall procedures/techniques for catapult launch

9.7.2.5.2.1.1

Identify catapult director/officer signals

9.8.1.11.1

Recall procedures to initiate suspend

9.8.1.15.1

Recall procedures for catapult malfunctions/emergencies

9.7.2.1.2.1

Recall procedures/techniques for performing Case I departure

9.7.2.1.2.2

Recall procedures/techniques for performing Case II departure

1.9.2.1.1

Recall NATOPS recovery and landing procedures for T-45

9.8.2.2.1.1

Identify procedures/techniques for flying a bingo profile (clean)

9.8.2.2.2.1

Identify procedures/techniques for flying a bingo profile (dirty)

9.8.2.1.1

Recall procedures/techniques for communications failure in pattern

LESSON OBJECTIVES (Cont.)**9.8.1.16.1**

Recall procedures/techniques for communications failure on deck

1.8.1.11

Recall safety of flight situations/procedures during operational flight

9.8.1.17.1

Recall procedures/techniques for blown tire

9.8.1.12.1

Recall procedures for NWS failure on deck

9.8.1.13.1

Recall procedures for brake failure on deck

9.8.1.14.2

Recall procedures for launch bar failing to retract

9.8.1.14.1

Identify indications of launch bar failing to retract

1.9.3.2.2

Recall procedures for landing gear unsafe/fails to extend

1.8.1.10.3.2

Recall procedures for ejection

1.9.2.16.2.2

Recall procedures/techniques for short field arrestment

Sg 0, fr 2

MOTIVATIONAL VIDEO

MOTIVATION

Carrier qualification is the most demanding and memorable **phase** of training. Successful carrier operations requires more than just flying the ball. You must know the procedures for flying to the ship, operating on and around it, and returning to base safely. Landing a **T-45** aboard the carrier will be the pinnacle of your training. This lesson will give you the background for procedural and emergency simulators.

OVERVIEW

This lesson will give you the basic flight, deck and emergency procedures for CQ.

This lesson covers the following topics:

- * Takeoff/en route
- * Carrier marshal pattern
- * Approaches to the ship
- * Carrier pattern/landing procedures
- * Deck procedures
- * Catapult procedures
- * Normal departure procedures
- * Bingo procedures
- * Emergency/safety of flight

REFRESHER

Recall that CQ procedures use the same pattern as used in FCLPs. All ground procedures previously learned are now modified for safe movement aboard the carrier.

PRESENTATION

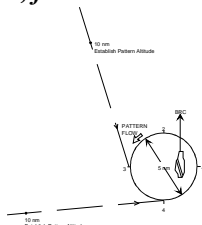
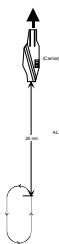
- I. Takeoff/en route
 - A. Take off and departure - IFR/VFR clearance/Rdv
 - B. En route to ship
 - C. Check in with marshal giving line up, qual number, low fuel state and "ANGELS"
 - D. Hold as assigned - note BRC
 - E. Anti-collision off, anti-skid off, hook bypass switch - carrier
 - F. Fuel
 - 1. Individual pilot responsibility
 - 2. Note bingo distance, bearing, and fuel required
 - 3. Hold down: bingo + 300 lbs
 - 4. Maximum trap weight 13,360 lbs

*Sg 1, fr 1***CARRIER
PROCEDURES**

- * Takeoff/en route
- * Carrier marshal pattern
- * Approaches to the ship
- * Carrier pattern/landing procedures
- * Deck procedures
- * Catapult procedures
- * Normal departure procedures
- * Bingo procedures
- * Emergency/safety of flight

*Sg 2, fr 1***CARRIER PROCEDURES**

- * Takeoff/en route
- * **Carrier marshal pattern**
- * Approaches to the ship
- * Carrier pattern/ landing procedures
- * Deck procedures
- * Catapult procedures
- * Normal departure procedures
- * Bingo procedures
- * Emergency/safety of flight

Sg 2, fr 2**CASE I MARSHAL PATTERN ENTRY***Sg 2, fr 3***CASE II MARSHAL HOLDING PATTERN****II. Carrier marshal pattern 9.7.2.6.1.1, 9.7.2.2.1****A. Case I procedures 9.7.2.1.1.1****1. Marshal pattern entry**

- a. Establish level flight at assigned altitude 10 nm prior to entering holding pattern in a balanced formation
- b. Enter holding pattern tangentially with wings level

2. Marshal (holding) pattern description

- a. Left-hand circling pattern (with flight in balanced formation) tangent to ship's BRC with ship at 3 o'clock position
- b. 5 nm in diameter
- c. At assigned altitude (1,500 ft min)
- d. At max conserve airspeed

B. Case II procedures 9.7.2.1.1.2**1. Holding**

- a. Add 15 to angels to get DME for holding inbound to the ship
- b. Left-hand racetrack pattern, section formation only (no division formation)
- c. Enter holding on assigned radial and computed DME
- d. Report established in holding to marshal with fuel state
- e. At assigned altitude (minimum: 5,000 ft [platform])
- f. Marshal airspeed: max conserve - 230 KIAS

III. Approaches to the ship **9.7.2.2.1**

A. Case I (wx 3,000/5)

1. Flight will descend from holding abeam or aft of the ship to set up for the initial
2. Be at 1,200 ft at 7 nm
3. Initial: 800 ft at 3 nm. Flight lead will call "Initial"
4. Concentrate on good formation (echelon - standard parade position)
5. Lead breaks on interval or not earlier than 1 nm past bow and wingmen
6. Spin procedures: initiate at the bow, climb to 1,200 ft, and remain within 3 nm and reenter for the break. Call "spin 90"

B. Case II (wx 1,500/5, tops not above 15,000 ft)

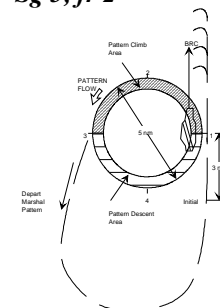
1. Students may penetrate in section only on an instructor's wing. Lead may break up the division for individual holding
2. Depart the holding point inbound at push time
3. Report commencing 250 KIAS descent, S/B out, 4-5,000 fpm
4. Lead will call "platform" at 5,000 ft (approximately 20 nm and shallow rate of descent to 2,000 fpm (minute to live rule)
5. If not VFR or ship is not in sight at 800 ft and 5 nm, climb straight ahead on the BRC to visual conditions on top of cloud layer
6. Ship in sight - call "see you" and switch tower. Enter normal break; 800 ft, 250-300 KIAS

Sg 3, fr 1

CARRIER PROCEDURES

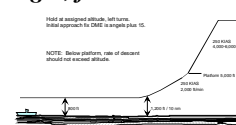
- * Takeoff/en route
- * Carrier marshal pattern
- * **Approaches to the ship**
- * Carrier pattern/landing procedures
- * Deck procedures
- * Catapult procedures
- * Normal departure procedures
- * Bingo procedures
- * Emergency/safety of flight

Sg 3, fr 2



**CASE I MARSHAL
PATTERN RECOVERY**

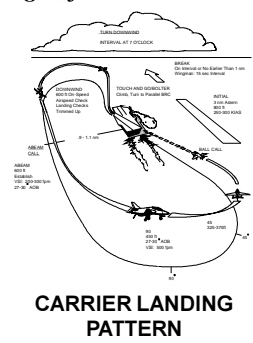
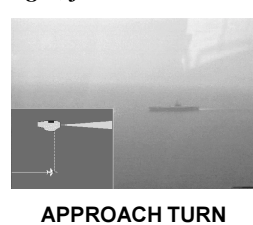
Sg 3, fr 3



**CASE II MARSHAL
PATTERN RECOVERY**

*Sg 4, fr 1***CARRIER PROCEDURES**

- * Takeoff/en route
- * Carrier marshal pattern
- * Approaches to the ship
- * **Carrier pattern/landing procedures**
- * Deck procedures
- * Catapult procedures
- * Normal departure procedures
- * Bingo procedures
- * Emergency/safety of flight

Sg 4, fr 2*Sg 4, fr 3***IV. Carrier pattern/landing procedures 9.7.2.2.2****A. Break 9.7.2.2.3**

1. 800 ft AGL, 250-300 KIAS with each succeeding aircraft at a 15 second interval

COMMON ERROR: **NOT** timing 15 seconds; **NOT** holding BRC heading and **NOT** holding altitude in the break.

2. Level break on the instruments
3. Descend to 600 ft when downwind

B. Downwind (Use CDI set on BRC)

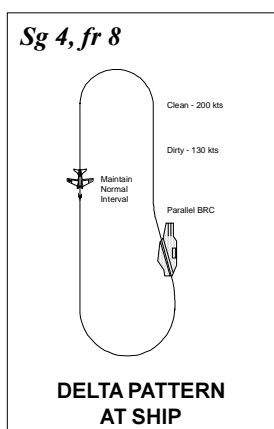
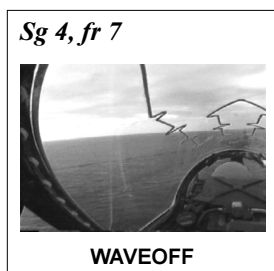
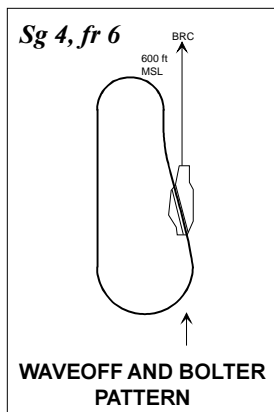
1. Landing checks - harness locked, anti-skid off, anti-collision light off, and hook up/down
2. Re-trim
3. AOA check
4. Report abeam with qual number. Don't talk if someone is on the ball!

C. Approach turn 9.7.2.3.5

1. Abeam position. Lead should set proper distance abeam (.9 to 1.1 nm)
2. Turn abeam LSO platform 27-30 degrees AOB. At the round down establish 200-300 fpm descent
3. 90-degree position: 450 ft AGL
4. 45-degree position: 325-375 ft AGL
5. Cross wake at 300-350 ft AGL, 500 fpm descent
6. Do not look for ball early

7. Ball acquisition - check VSI and adjust (500-600 fpm)
 8. Radar altimeter no lower than 300 ft without a ball
 9. Fly the numbers - will appear close and steep
- D. In the groove **9.7.2.3.1.1, 9.7.2.3.4.1**
1. Work for good start
 2. Call the ball: side number, Goshawk ball, fuel state, and qual number
 3. Meatball, lineup, angle of attack
 4. Fly the ball all the way to touchdown. Landing should be a surprise. MRT and speed brakes in upon touchdown
 5. Line up with new corrections to touchdown
 6. Do not spot the deck
 7. Never accept a low ball
- E. Touch-and-Go or Bolter - fly the ball to touchdown **9.7.2.3.5.1.1**
1. MRT, speed brakes in, rotate, and climb
 2. Turn to parallel BRC (10 degrees to the right)
 3. If necessary, ask for interval
 4. First aircraft to the bow has priority
 5. Turn downwind with interval at 7 o'clock
 6. Fly instruments - 30 degrees AOB, 130 KIAS
 7. Reciprocal of BRC, .9-1.1 nm abeam

Sg 4, fr 4**IN THE GROOVE***Sg 4, fr 5***TOUCH-AND-GO**



F. Waveoff 9.7.2.3.7.1

1. Waveoff procedures

- Simultaneously advance power to MRT, retract speed brakes, maintain landing attitude
- Maintain wings level if in groove; if in pattern, fly up the angled deck or as directed
- Verify positive rate of climb
- Maintain optimum AOA
- Once positive rate of climb is established and aircraft is abeam bow, turn right to parallel ship's BRC
- Climb to 600 ft
- Turn downwind with proper interval
- Perform landing checklist

G. Delta procedures 9.7.1.5.1

1. Delta Easy

- Maintain same ground track at 600 ft and maintain interval
- Maintain landing configuration
- Retract speed brakes
- Maintain 130 KIAS (dirty)
- When cleared from Delta pattern first aircraft to reach 180-degree position resumes normal approach

2. Delta Clean

- a. Fly racetrack pattern clean at 200 KIAS
- b. Maintain pattern interval
- c. When cleared from Delta pattern dirty up and descend to pattern altitude

*Sg 5, fr 1***CARRIER PROCEDURES**

- * Takeoff/en route
- * Carrier marshal pattern
- * Approaches to the ship
- * Carrier pattern/landing procedures
- * **Deck procedures**
- * Catapult procedures
- * Normal departure procedures
- * Bingo procedures
- * Emergency/safety of flight

Sg 5, fr 2**ARRESTMENT***Sg 5, fr 2 Overlay 1**In the Groove***Overlay 2***General Layout***Overlay 3***Foul Lines***Overlay 4***Elevators***Overlay 5***Catapults***Overlay 6***IFLOLS/FLOLS**Location**Sg 5, fr 3***TAXI TO JBD****V. Deck procedures 9.7.2.3.8.1, 9.7.2.4.1.1****A. Arrestment**

1. Fly the ball to touchdown - be surprised
2. MRT speed brakes in on touchdown - do not reduce power until engine is at MRT and aircraft stops (no cuts)
3. Yellow shirt director at 1 o'clock - watch signals (off brakes, pull back, raise hook)

B. Leaving landing area

1. 70% max
2. Use NWS, high gain
3. Follow taxi director - exactly; if in doubt STOP!
4. Foul line; slippery deck

C. Flight deck areas

1. General layout
2. Foul lines
3. Elevators
4. Catapults
5. IFLOLS/FLOLS location

D. Taxi to JBD 9.7.2.4.2.1

1. Route and placement of director
2. Notify tower if fuel is at or below hold down. If anticipating a delay that will put you below hold down, notify the tower
3. Take-off checklist prior to crossing JBD (full flaps, 3 1/2 degrees nose up trim/baro altimeter should read 60 ft)

4. Compute takeoff weight
5. Weight board/signals (500-lb increments)

VI. Catapult procedures **9.7.2.5.1.1, 9.7.2.5.2.1, 9.7.2.5.2.1.1**

A. Catapult hook-up

1. Taxi slowly
2. Extend launch bar when directed

Note: Ensure takeoff checklist has been completed and a correct weight board has been “Rogerred” prior to extending the launch bar.

3. Use high gain NWS only when directed (+/- 20 degrees; low gain not available)
4. Brake as directed

B. Tension/launch

1. MRT
2. Wipe out controls (including rudder)
3. Check instrument
4. Retract launch bar ($\geq 90\%$)

WARNING: Selecting launch bar RETRACT before receiving the retract signal from the aircraft director may raise the launch bar before it is properly seated in the shuttle spreader assembly, resulting in a mispositioned launch bar.

5. Heels on deck, toes positioned below **Toe Bars - OFF BRAKES!**
6. Salute Cat Officer

Sg 6, fr 1

CARRIER PROCEDURES

- * Takeoff/en route
- * Carrier marshal pattern
- * Approaches to the ship
- * Carrier pattern/landing procedures
- * Deck procedures
- * **Catapult procedures**
- * Normal departure procedures
- * Bingo procedures
- * Emergency/safety of flight

Sg 6, fr 2



CATAPULT HOOK-UP

Sg 6, fr 3



CAT LAUNCH

Sg 6, fr 3, p1

PEDAL TOE BAR

C. Catapult techniques

1. Hold stick lightly - allow it to come back aft during the stroke, then set 8-10 degrees as aircraft becomes airborne
2. Scan ADI, AOA airspeed. Do not over or under rotate. Elevator trim will rotate the aircraft to the proper climbing attitude. AOA will initially be approximately 19 units but will accelerate to 17 units quickly. Check heading, BRC, airspeed, and interval. Lower hook if required



D. Suspend 9.8.1.11.1

1. Prior to salute - shake head "no" and broadcast "Suspend, suspend!" (Keep hands below canopy rails)
2. After salute - same, but be ready to go
3. Remain at MRT until Cat Officer moves in front of aircraft with "throttle back" signal

WARNING: Do not throttle back until the catapult officer walks in front of the aircraft and gives the throttle back signal.

E. Catapult malfunctions 9.8.1.15.1

1. Cold/soft start
2. Broken holdback
3. Hangfire
4. Launch bar failure

VII. Normal departure procedures

A. Case I 9.7.2.1.2.1

1. Clean up, straight ahead (parallel BRC) at 500 ft to 7 nm at 300 KIAS or as directed
2. Turn shortest direction to field and climb. Stay away from overhead marshal stack (outside of 10 nm)
3. Contact departure when directed
4. Once in contact with approach ("Sweet lock, sweet comm") check out with departure

B. Case II 9.7.2.1.2.2

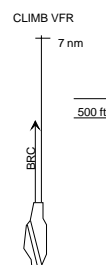
1. Straight ahead at 500 ft to 7 nm at 300 KIAS or as directed by departure
2. At 7 nm, turn in appropriate direction onto the 10 nm arc and intercept the departure radial outbound
3. If joining other aircraft, execute TACAN rendezvous (VFR on top) on departure radial at a distance of angels plus 15 miles
4. All aircraft shall report airborne, arcing, and outbound. Remain VMC established outbound on departure radial
5. Once in contact with approach ("Sweet lock, sweet comm") check out with departure

Sg 7, fr 1

CARRIER PROCEDURES

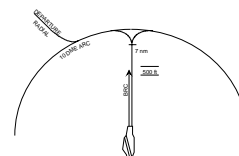
- * Takeoff/en route
- * Carrier marshal pattern
- * Approaches to the ship
- * Carrier pattern/landing procedures
- * Deck procedures
- * Catapult procedures
- * **Normal departure procedures**
- * Bingo procedures
- * Emergency/safety of flight

Sg 7, fr 2



CASE I DEPARTURE

Sg 7, fr 3



CASE II DEPARTURE

C. Full stop ashore **1.9.2.1.1**

1. Complete landing checklist
 - a. Ensure hook **UP**
 - b. Ensure anti-skid **ON**
 - c. Ensure anti-collision light **ON**
2. Use caution when braking with carrier pressurization
3. Take a full landing rollout

VIII. Bingo procedures 9.8.2.2.1.1, 9.8.2.2.2.1

NOTE: While CQ is in progress there will be a lead safe overhead with enough fuel to escort the remaining SNPs back to home base on the designated bingo profile. Tower updates “pigeons” information which refers to bearing and range to the bingo field. The lead safe will “hawk” and low state SNPs and if the SNP does not trap, will join on that SNP and provide escort to the bingo field.

A. Be prepared to bingo

1. Know available bingo fields
2. Know dirty/clean profiles
3. Update bingo info (write it down)

B. Procedures

1. Notify tower when at bingo - don't wait to be asked.
This is an Emergency Procedure!
2. Turn to bingo heading (check compass)
3. Cleanup - including hook
4. Accel to bingo profile airspeed
5. Commence MRT climb to pre-determined altitude (as per PCL Bingo Chart)

C. Once established

1. Switch to departure and tune in bingo TACAN.
Squawk 7700
2. Don't wait for safety pilot to join
3. Go IMC if necessary to preserve profile
4. Coordinate with Approach Control (emergency fuel - “20 minutes”)

Sg 8, fr 1

CARRIER PROCEDURES

- * Takeoff/en route
- * Carrier marshal pattern
- * Approaches to the ship
- * Carrier pattern/landing procedures
- * Deck procedures
- * Catapult procedures
- * Normal departure procedures
- * **Bingo procedures**
- * Emergency/safety of flight

Sg 8, fr 2

SAMPLE BINGO
GEAR UP - FLAPS UP
ZERO FUEL WEIGHT - 10,500 lb

MAXIMUM RANGE CRUISE									
DIST TO BASE	FUEL REQ'D	TIME REQ'D	CLIMB		CRUISE		DESCEND		NM
			SPEED	ALT	SPEED	SPEED	SPEED	DIST	
25	421	7			5,000	217	.36		14
50	538	13			10,000	219	.40		27
75	626	19			15,000	217	.43		40
100	714	24			20,000	217	.46		54
125	796	29			25,000	223	.54	180	67
150	871	33			30,000	220	.59		80
175	938	37			35,000	218	.65		93
200	1,002	41			35,000	218	.65		93
225	1,066	45			35,000	218	.65		93
250	1,128	48			40,000	211	.71		107

Sg 8, fr 3

SAMPLE BINGO
GEAR DOWN - FLAPS UP
ZERO FUEL WEIGHT - 10,500 lb

MAXIMUM RANGE CRUISE									
DIST TO BASE	FUEL REQ'D	TIME REQ'D	CLIMB		CRUISE		DESCEND		NM
			SPEED	ALT	SPEED	SPEED	SPEED	DIST	
25	507	9			7,500	154	.27		12
50	785	18			15,000	151	.30		25
75	988	25			20,000	148	.33		33
100	1,181	32			22,000	146	.34		37
125	1,371	39			25,000	144	.36	140	41
150	1,550	45			25,000	145	.36		41
175	1,722	53			25,000	145	.36		41
200	1,946	59			25,000	146	.36		41
225	2,162	66			25,000	146	.36		41
250	2,340	73			25,000	146	.36		41

D. Recovery

1. Downwind or base leg entry, VFR straight-in, min fuel GCA
2. Heads up for other A/C
3. Land on speed

IX. Emergency/safety of flight**A. Communication failure (NORDO) 9.8.2.1.1**

1. Enroute - hand signals - expect section approach
2. In pattern
 - a. Fly normal pattern
 - b. Cut lights - "Roger ball" / "Power"
 - c. No cut lights - waveoff up landing area, rocking wings
 - d. Rock your wings, clean up, climb to 500 ft; accelerate to 230 KIAS, turn left at 5 DME, stay within 5 DME; a lead safe will join on you
 - e. If bingo fuel - BINGO! (Squawk Emergency)
3. On deck **9.8.1.16.1**

B. Safety of Flight 1.8.1.11

1. Loss of NAV AIDS
2. Lost plane
3. Lost sight/inadvertent IMC
4. Down plane/SAR
5. Bird strike
6. Midair

C. On deck

1. Blown tire **9.8.1.17.1**
 - a. Airborne - dirty bingo/TRAP
 - b. On deck - taxi/tow

*Sg 9, fr 1***CARRIER
PROCEDURES**

- * Takeoff/en route
- * Carrier marshal pattern
- * Approaches to the ship
- * Carrier pattern/landing procedures
- * Deck procedures
- * Catapult procedures
- * Normal departure procedures
- * Bingo procedures
- * **Emergency/safety of flight**

2. Nosewheel steering failure - stop aircraft **9.8.1.12.1**
3. Brake failure **9.8.1.13.1**
4. Launch bar light/launch bar down airborne
9.8.1.14.2, 9.8.1.14.1
 - a. Get confirmation
 - b. Expect dirty bingo
5. Catapult emergency **9.8.1.15.1**
 - a. Accel light
 - b. Hang fire
 - c. Suspend
 - d. Holdback failure
 - e. Cold/soft cat
 - f. Launch bar failure
 - g. Flameout
6. Landing gear malfunctions; probable steer **1.9.3.2.2**
7. Hydraulic failure - dirty bingo
8. Low altitude ejection (clean and dirty) **1.8.1.10.3.2**
 - a. Over water
 - b. Water survival
 - c. Helo rescue
9. Short-field arrestment **1.9.2.16.2.2**

SUMMARY

This lesson covered the following topics:

- * Takeoff/en route
- * Carrier marshal pattern
- * Approaches to the ship
- * Carrier pattern/landing procedures
- * Deck procedures
- * Catapult procedures
- * Normal departure procedures
- * Bingo procedures
- * Emergency/safety of flight

CONCLUSION

The procedures you have learned here will be practiced in the simulator and will be covered in greater detail in the ship's brief. You now have a base line for procedures that will be used in your carrier qualification flight and carry you through your career as a carrier aviator

Sg 10, fr 1

**CARRIER
QUALIFICATION
SHIPBOARD
PROCEDURES
REVIEW OPTIONS**

1. Entire lesson
2. Carrier marshal pattern
3. Approaches to the ship
4. Carrier pattern/landing procedures
5. Deck procedures
6. Catapult procedures
7. Normal departure procedures
8. Bingo procedures
9. End this lesson

Please select

NOTES

FLIGHT SUPPORT LECTURE GUIDE

COURSE/STAGE: TS, ADV, & IUT / Carrier Qualification

LESSON TITLE: Ship's Brief

LESSON IDENTIFIER: T-45 TS & ADV CQFP-05; IUT CQFP-03

LEARNING ENVIRONMENT: Classroom

ALLOTTED LESSON TIME: 3.0 hr

TRAINING AIDS:

- * None

STUDY RESOURCES:

- * T-45 NATOPS Flight Manual, A1-T45AB-NFM-000 or A1-T45AC-NFM-000
- * LSO NATOPS Manual, NAVAIR 00-80T-104
- * T-45 Carrier Qualification FTI

LESSON PREPARATION: N/A

REINFORCEMENT: N/A

EXAMINATION:

The objectives in this lesson will be tested in TS & ADV CQFP-06X; IUT CQFP-04X.

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LESSON OBJECTIVES**9.2.3**

Receive ship's brief

9.7.2.1.1.1

Interpret marshal procedures (Case I)

9.7.2.1.1.2

Interpret marshal procedures (Case II)

9.7.2.6.1.1

Recall procedures/techniques for CV pattern entry

9.7.2.2.1

Recall procedures/techniques for the carrier pattern

9.7.2.3.1.1

Recall the procedures/techniques for controlling glideslope and airspeed on carrier approach

9.7.2.3.3.1

Recall the principle for controlling lineup on carrier approach

9.7.2.3.4.1

Recall the procedures/techniques in response to LSO commands during carrier approach

9.7.2.3.7.1.1

Identify criteria for executing a waveoff

9.7.2.3.7.1

Recall procedures/techniques for performing a waveoff

9.7.1.5.1

Recall procedures for Delta pattern

9.7.2.3.8.1

Recall procedures/techniques for arrested landings

9.7.2.4.1.1

Recall after CV arrestment procedures

LESSON OBJECTIVES (Cont.)**9.7.2.4.2.1**

Recall procedures/techniques for taxiing aircraft on flight deck

9.7.2.4.6.2

Identify the various types of flight deck personnel

9.7.2.4.6.3

Recall the functions/responsibilities of the various types of flight deck personnel

9.7.2.4.6.1

Identify signals used by flight deck personnel

9.7.2.5.2.1.1

Identify catapult director/officer signals

9.7.2.5.1.1

Recall procedures for catapult hook-up

9.7.2.5.2.1

Recall procedures/techniques for catapult launch

9.8.1.11.1

Recall procedures to initiate suspend

9.8.1.15.1

Recall procedures for catapult malfunctions/emergencies

9.7.2.4.3

Recall procedures for performing hot refueling on CV flight deck

9.7.2.4.4

Recall preflight procedures on CV flight deck

9.7.2.4.5.1

Recall procedures for manning aircraft on CV flight deck

9.7.2.4.4.1

Recall procedures for shutdown of aircraft on CV flight deck

LESSON OBJECTIVES (Cont.)**9.7.2.1.2.1**

Recall procedures/techniques for performing Case I departure

9.7.2.1.2.2

Recall procedures/techniques for performing Case II departure

9.8.2.2.1

Compute a bingo profile (clean)

9.8.2.2.1.1

Recall procedures/techniques for flying a bingo profile (clean)

9.8.2.2.2

Compute a bingo profile (dirty)

9.8.2.2.2.1

Recall procedures/techniques for flying a bingo profile (dirty)

9.8.2.1.1

Recall procedures for communications failure in pattern

9.8.1.16.1

Recall procedures for communications failure on flight deck

1.8.1.11

Recall safety of flight situations/procedures during operational flight

9.8.1.17.1

Recall procedures/techniques for blown tire

9.8.1.12.1

Recall the procedures for NWS failure on deck

9.8.1.13.1

Recall procedures for brake failure on deck

9.8.1.14.1

Identify indications of launch bar failing to retract

LESSON OBJECTIVES (Cont.)**9.8.1.14.2**

Recall procedures for launch bar failing to retract

9.8.1.18.1

Recall procedures/techniques for cross-deck pendant/hook point failure

MOTIVATION

The goal of every Naval officer who is selected for jet pilot training is to become a tactical carrier pilot. Carrier pilots are the best because they must be the best: the carrier environment will not tolerate anything less. Landing and launching aircraft, moving equipment, and personnel in a relatively small area requires precise coordination for safe operation. Handling aircraft on a flight deck is more complicated than at the field due to the high winds across the deck, the proximity of the deck edge, and the ship's movement. Successful and safe operations in and around the carrier depend on a coordinated team effort in which all team members do their job properly. There is no excuse for not knowing and not using correct procedures around the ship, and there are no exceptions to this rule!

Sg 0, fr 2**MOTIVATIONAL VIDEO**

OVERVIEW

In the ship's brief, the LSO summarizes the major areas of academic and operational interest to all personnel involved with carrier qualification.

This lesson covers the following topics:

- * Ship's brief overview
- * Administrative and general information
- * Brief
- * Preflight
- * Ground procedures
- * Takeoff/ en route
- * Carrier marshal pattern
- * Approaches to the ship
- * Carrier pattern/landing procedures
- * Deck procedures
- * Deck personnel
- * Catapult procedures
- * Refueling/starting/shutdown
- * Normal departure procedure
- * Bingo procedures
- * Emergency/safety of flight
- * LSO calls/grades
- * Miscellaneous

REFRESHER

Recall that CQ procedures are nothing more than modified FCLP procedures with the exception that the simulated carrier deck you have been using is no longer simulated. All ground procedures previously learned are now modified to ensure safe movement of your aircraft on board a small, crowded, and moving flight deck.

PRESENTATION**I. Ship's brief overview**

- A. Administrative and general information
- B. Brief
- C. Preflight
- D. Ground procedures
- E. Takeoff and en route procedures
- F. Carrier marshal pattern
- G. Approaches to the ship
- H. Carrier pattern/landing procedures
- I. Deck procedures
- J. Deck personnel
- K. Catapult procedures
- L. Refueling/starting/shutdown
- M. Normal departure procedures
- N. Bingo procedures
- O. Emergency/safety of flight
- P. LSO calls/grades
- Q. Miscellaneous

*Sg 2, fr 1***SHIP'S BRIEF***** Ship's brief overview**

- * Administrative/general information
- * Brief
- * Preflight
- * Ground procedures
- * Takeoff/en route
- * Carrier marshal pattern
- * Approaches to the ship
- * Carrier pattern/landing procedures
- * Deck procedures
- * Coffee Break

*Sg 2, fr 1***SHIP'S BRIEF**

- * Ship's brief overview
- * **Administrative/general information**
- * Brief
- * Preflight
- * Ground procedures
- * Takeoff/en route
- * Carrier marshal pattern
- * Approaches to the ship
- * Carrier pattern/landing procedures
- * Deck procedures
- * Coffee Break

II. Administrative/general information**A. Preparation**

1. Mental
2. Physical

B. Administrative items

1. Billeting
2. Ground transportation
3. Scheduling
4. Points of contact
 - a. Duty officer
 - b. Flight lead
 - c. Maintenance
5. Returning to home base
 - a. Syllabus flight
 - b. Airlift
 - (1) Air terminal
 - (a) Location
 - (b) Show time
 - (2) Uniform
 - (3) Baggage, flight gear

C. Call signs for CQ ships

1. Ship call sign: ship's Commanding Officer
2. "Tower": Air Boss
3. "Strike": strike operations
4. "Marshal": enroute controller

D. Common Terms

1. Pigeons
2. Starboard Delta
3. Spin
4. See you
5. Steer
6. Pogo
7. Mother
8. Mark your father
9. Strangle your parrot
10. Buster
11. Popeye

*Sg 2, fr 2***COMMON TERMS**

- * Pigeons
- * Starboard Delta
- * Spin
- * See you
- * Steer
- * Pogo
- * Mother
- * Mark your father
- * Strangle your parrot
- * Buster
- * Popeye

*Sg 2, fr 3***COMMON TERMS**

- * Charlie
- * Angels/Cherubs
- * Feet wet/feet dry
- * Chicks
- * On-the-ball
- * Father
- * Hawk
- * Clara

12. Charlie

13. Angels/Cherubs

14. Feet wet/feet dry

15. Chicks

16. On-the-ball

17. Father

18. Hawk

19. Clara

III. Brief 9.2.3

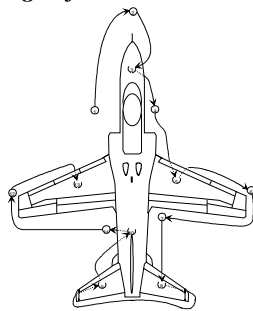
- A. Course rules
- B. Ship's position/NAVAIDS
- C. Call sign/line up
- D. Walk, man-up, takeoff, and "Charlie" times
- E. Weather
 - 1. Departure/en route/ship
 - 2. Divert field
 - 3. Bingo field
- F. Fuel requirements
- G. Communication plan

*Sg 3, fr 1***SHIP'S BRIEF**

- * Ship's brief overview
- * Administrative/general information
- * **Brief**
 - * Preflight
 - * Ground procedures
 - * Takeoff/en route
 - * Carrier marshal pattern
 - * Approaches to the ship
 - * Carrier pattern/landing procedures
 - * Deck procedures
 - * Coffee Break

Sg 4, fr 1**SHIP'S BRIEF**

- * Ship's brief overview
- * Administrative/ general information
- * Brief
- * **Preflight**
- * Ground procedures
- * Takeoff/en route
- * Carrier marshal pattern
- * Approaches to the ship
- * Carrier pattern/ landing procedures
- * Deck procedures
- * Coffee Break

Sg 4, fr 2**PREFLIGHT INSPECTION
PATH****IV. Preflight**

- A. Carrierization card in A.D.B. (empty wt.)
- B. Tire pressure
- C. Launch bar
- D. Holdback assembly
- E. Landing gear - proper servicing; security
- F. Tailhook - security; greased
- G. Tailhook snubber pressure - 950 psi +/- 50 psi
- H. Cockpit
 - 1. Instruments secure - both cockpits
 - 2. No loose gear, minimum pubs/gear in cockpit
 - 3. Check cat grip
 - 4. Rear cockpit - harness locked; "soloized"

V. Ground procedures

- A. Marshal
- B. Radio check channelization
- C. Taxi (bumpier due to carrier pressure)

Sg 5, fr 1

SHIP'S BRIEF

- * Ship's brief overview
- * Administrative/ general information
- * Brief
- * Preflight
- * **Ground procedures**
- * Takeoff/en route
- * Carrier marshal pattern
- * Approaches to the ship
- * Carrier pattern/ landing procedures
- * Deck procedures
- * Coffee Break

*Sg 6, fr 1***SHIP'S BRIEF**

- * Ship's brief overview
- * Administrative/general information
- * Brief
- * Preflight
- * Ground procedures
- * **Takeoff/en route**
- * Carrier marshal pattern
- * Approaches to the ship
- * Carrier pattern/landing procedures
- * Deck procedures
- * Coffee Break

VI. Takeoff/en route

- A. Take off and departure - IFR/VFR clearance/rendezvous
- B. En route to ship
- C. Check in with Marshal giving lineup, qual number, low fuel state and "ANGELS"
- D. Hold as assigned - note BRC
- E. Anti-collision light - off, anti-skid - off, hook bypass switch - carrier
- F. Fuel
 - 1. Individual pilot responsibility
 - 2. Note bingo distance, bearing, and fuel required
 - 3. Hold down: bingo + 300 lbs
 - 4. Maximum trap weight 13,360 lbs

VII. Carrier marshal pattern

A. Case I procedures 9.7.2.1.1.1

1. Marshal pattern entry

- a. Establish level flight at assigned altitude 10 nm prior to entering holding pattern in a balanced formation
- b. Enter holding pattern tangentially with wings level

2. Marshal (holding) pattern description

- a. Left-hand circling pattern (with flight in balanced formation) tangent to ship's BRC with ship at 3 o'clock position
- b. 5 nm in diameter
- c. At assigned altitude (1,500 ft min)
- d. At max conserve airspeed

B. Case II procedures 9.7.2.1.1.2

1. Holding

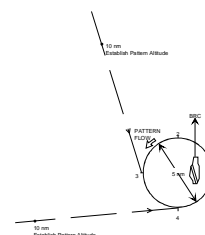
- a. Add 15 to angels to get DME for holding inbound to the ship
- b. Left-hand racetrack pattern, section formation only (no division formation)
- c. Enter holding on assigned radial and computed DME
- d. Report established in holding to marshal with fuel state
- e. At assigned altitude [minimum: 5,000 ft (platform)]
- f. Marshal airspeed: max conserve - 230 KIAS

Sg 7, fr 1

SHIP'S BRIEF

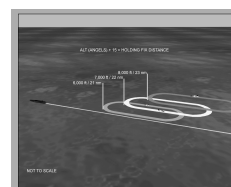
- * Ship's brief overview
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- * **Carrier marshal pattern**
- * Approaches to the ship
- * Carrier pattern/landing procedures
- * Deck procedures
- * Coffee Break

Sg 7, fr 2



**CASE I MARSHAL
PATTERN ENTRY**

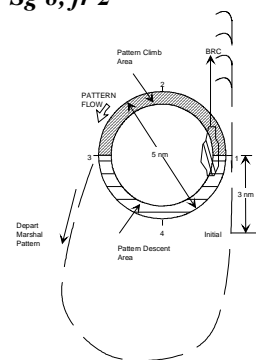
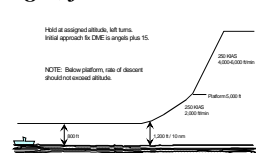
Sg 7, fr 3



**CASE II MARSHAL
HOLDING PATTERN**

*Sg 8, fr 1***SHIP'S BRIEF**

- * Ship's brief overview
- * Administrative/general information
- * Brief
- * Preflight
- * Ground procedures
- * Takeoff/en route
- * Carrier marshal pattern
- * **Approaches to the ship**
- * Carrier pattern/landing procedures
- * Deck procedures
- * Coffee Break

Sg 8, fr 2**CASE I MARSHAL PATTERN RECOVERY***Sg 8, fr 3***CASE II MARSHAL PATTERN RECOVERY****VIII. Approaches to the ship 9.7.2.6.1.1****A. Case I (wx 3,000/5)**

1. Flight will descend from holding abeam or aft of the ship to set up for the initial
2. Be at 1,200 ft at 7 nm
3. Initial: 800 ft at 3 nm. Flight lead will call "Initial"
4. Concentrate on good formation (echelon - standard parade position)
5. Lead breaks on interval or not earlier than 1 nm past bow and wingmen break at 15-second intervals
6. Spin procedures: initiate at the bow, climb to 1,200 ft, and remain within 3 nm and reenter for the break. Call "spin 90"

B. Case II (wx 1,500/5, tops not above 15,000 ft)

1. Students may penetrate in section only on an instructor's wing. Lead may break up the division for individual holding
2. Depart the holding point inbound at push time
3. Report commencing 250-KIAS descent, speed brakes out, 4-5,000 fpm
4. Lead will call "platform" at 5,000 ft (approximately 20 nm and shallow rate of descent to 2,000 fpm (minute to live rule)
5. If not VFR or ship is not in sight at 800 ft and 5 nm, climb straight ahead on the BRC to visual conditions on top of cloud layer
6. Ship in sight - call "see you" and switch to tower. Enter normal break; 800 ft, 250-300 KIAS

IX. Carrier pattern/landing procedures 9.7.2.2.1, 9.7.2.3.1.1, 9.7.2.3.3.1, 9.7.2.3.4.1

A. Break

1. 800 ft AGL, 15 units AOA with each succeeding aircraft at a 15-second interval

COMMON ERROR: **NOT** timing 15 seconds; **NOT** holding BRC heading, and **NOT** holding altitude in the break.

2. Level break on the instruments
3. Descend to 600 ft when downwind

B. Downwind (Use CDI set on BRC)

1. Landing checks - harness locked, anti-skid off, anti-collision light off, and hook up/down
2. Retrim
3. AOA check
4. Report abeam with qual number. Don't talk if someone is on the ball!

C. Approach turn

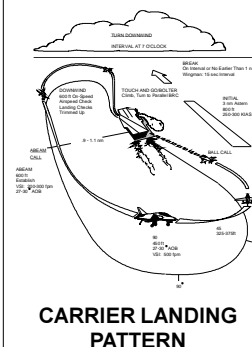
1. Abeam position. Lead should set proper distance abeam (0.9 to 1.1 nm)
2. Turn abeam LSO platform 27-30 degrees AOB. At the round down, establish 200-300 fpm descent
3. 90-degree position: 450 ft AGL
4. 45-degree position: 325-375 ft AGL
5. Cross wake at 300-350 ft AGL, 500 fpm descent
6. Do not look for ball early

Sg 9, fr 1

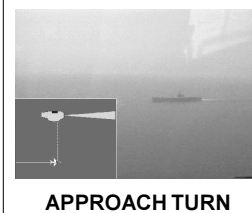
SHIP'S BRIEF

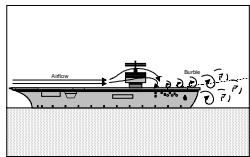
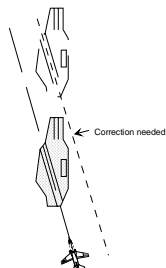
- * Ship's brief overview
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- * Approaches to the ship
- * **Carrier pattern/landing procedures**
- * Deck procedures
- * Coffee Break

Sg 9, fr 2



Sg 9, fr 3



Sg 9, fr 4**IN THE GROOVE***Sg 9, fr 5***BURBLE***Sg 9, fr 6***LINEUP DIFFICULTIES**

7. Ball acquisition - check VSI and adjust (500-600 fpm)

8. Radar altimeter no lower than 300 ft without a ball

9. Fly the numbers - will appear close and steep

D. In the groove

1. Work for good start

2. Call the ball: side number, Goshawk ball, fuel state, and qual number

3. Meatball, lineup, angle of attack

4. Fly the ball all the way to touchdown. Landing should be a surprise. MRT and speed brake in upon touchdown

5. Line up with new corrections to touchdown

6. Do not spot the deck

7. Never accept a low ball

E. Differences between carrier approaches and field approaches

1. More power is required to work off a low ball

2. Easier at ship to work off high ball

3. Burble affects on glideslope

4. Harder to correct lineup at the ship

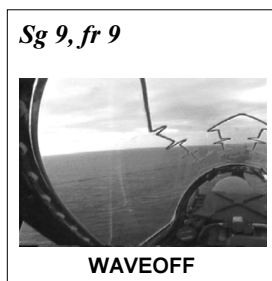
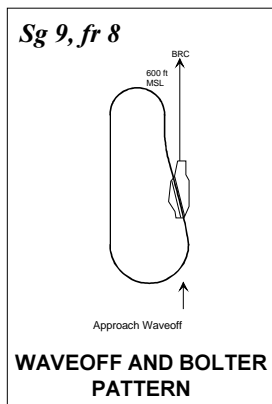
a. Length of deck

b. Movement of angled deck

- c. Roll out with centerline between legs and keep it there all the way to touchdown--remember that on calm days when the ship makes its own wind (axial wind), a right-to-left crosswind may result
 - 5. At ship, 90-degree position looks high and tight due to angled deck
 - 6. Tendency at ship to spot deck in close, resulting in excessive sink rate at the ramp and a one-wire
 - 7. Tendency at ship to fixate on single item, causing scan breakdown. Don't fixate, keep your scan moving
- F. Touch-and-go or bolter - fly the ball to touchdown
- 1. MRT, speed brakes in, rotate, and climb
 - 2. Turn to parallel BRC (10 degrees to the right)
 - 3. If necessary, ask for interval
 - 4. First aircraft to the bow has priority
 - 5. Turn downwind with interval at 7 o'clock
 - 6. Fly instruments - 30 degrees AOB, 130 KIAS
 - 7. Reciprocal of BRC, 0.9-1.1 nm abeam

Sg 9, fr 7

TOUCH-AND-GO



G. Waveoff 9.7.2.3.7.1.1, 9.7.2.3.7.1

NOTE: All waveoffs are made up the angled deck unless otherwise directed by the LSO or tower, i.e., waveoff starboard side.

NOTE: Students will not initiate their own waveoff, unless the ball call has not been rogered by the in-the-middle position. Waveoffs are mandatory when directed by tower or LSO.

1. Reasons for waveoffs (non-pilot)
 - a. Fouled deck--aircraft or flight deck personnel in landing area or an aircraft over foul line
 - b. Winds out of limits for safe landing
 - c. Pitching deck
2. Reasons for waveoffs (pilot error)
 - a. Overshooting/undershooting centerline
 - b. Landing gear, or flaps/slats not down
 - c. Climb in close
 - d. Excessive rate of descent in close
 - e. Excessively long in the groove
 - f. Excessive drift
 - g. Excessively high or low on glideslope
3. Waveoff procedures
 - a. Simultaneously advance power to MRT, retract speed brakes, maintain landing attitude
 - b. Maintain wings level if in groove; if in pattern, fly up the angled deck or as directed

- c. Verify positive rate of climb
- d. Maintain optimum AOA
- e. Once positive rate of climb is established and aircraft is abeam bow, turn right to parallel ship's BRC
- f. Climb to 600 ft
- g. Turn downwind with proper interval
- h. Perform landing checklist

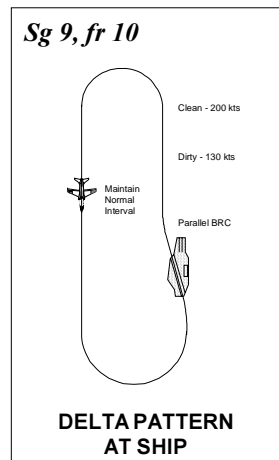
H. Delta procedures **9.7.1.5.1**

1. Delta easy

- a. Maintain same ground track at 600 ft and maintain interval
- b. Maintain landing configuration
- c. Retract speed brakes
- d. Maintain 130 KIAS (dirty)
- e. When cleared from Delta pattern, first aircraft to reach 180-degree position resumes normal approach

2. Delta clean

- a. Fly racetrack pattern clean at 200 KIAS
- b. Maintain pattern interval
- c. When cleared from Delta pattern, dirty up and descend to pattern altitude



Sg 10, fr 1**SHIP'S BRIEF**

- * Ship's brief overview
- * Administrative/general information
- * Brief
- * Preflight
- * Ground procedures
- * Takeoff/en route
- * Carrier marshal pattern
- * Approaches to the ship
- * Carrier pattern/landing procedures
- * **Deck procedures**
- * Coffee Break

Sg 10, fr 2**ARRESTMENT*****Sg 10, fr 2 Overlay 1****In the Groove****Overlay 2****General Layout****Overlay 3****Foul Lines****Overlay 4****Elevators****Overlay 5****Catapults****Overlay 6****IFLOLS/FLOLS**Location***X. Deck procedures 9.7.2.3.8.1., 9.7.2.4.1.1, 9.7.2.4.2.1****A. Arrestment**

1. Fly the ball to touchdown - be surprised
2. MRT speed brakes in on touchdown - do not reduce power until engine is at MRT and aircraft stops (no cuts)
3. Yellow shirt director at 1 o'clock - watch signals (off brakes, pull back, raise hook)

B. Leaving landing area

1. 70% max
2. Use NWS, high gain
3. Follow taxi director - exactly; if in doubt, **STOP!**
4. Foul line; slippery deck

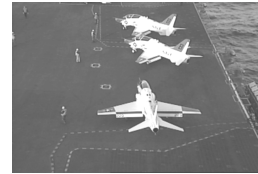
C. Flight deck areas

1. General layout
2. Foul lines
3. Elevators
4. Catapults
5. IFLOLS/FLOLS Location

D. Taxi to JBD

1. Route and placement of director
2. Notify tower if fuel is at or below **hold down**. If anticipating a delay that will put you below **hold down**, notify the tower
3. Takeoff checklist prior to crossing JBD (full flaps, 3 1/2 degrees nose up trim, BARO altimeter should read 60 ft)
4. Compute takeoff weight
5. Weight board/signals (500-lb increments)
6. Stop and notify tower if you lose sight of your director or you are unsure who your director is

Sg 10, fr 3



DAISY CHAIN

Sg 10, fr 4



TAXI TO JBD

Sg 10, fr 5



WEIGHT BOARD

Sg 11, fr 1

SHIP'S BRIEF

- * Ship's brief overview
- * Administrative/ general information
- * Brief
- * Preflight
- * Ground procedures
- * Takeoff/en route
- * Carrier marshal pattern
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- * Carrier pattern/ landing procedures
- * Deck procedures
- * **Coffee Break**

Sg 11, fr 2



COFFEE BREAK

XI. Coffee Break

XII. Deck personnel 9.7.2.4.6.2, 9.7.2.4.6.3**A. Identification and roles**

NOTE: Flight Deck Officers, Chief Warrant Officers, and Chief Petty Officers wear khaki pants. Catapult and Arresting Gear Officers can be identified by orange and green reflective tape on their cranials.

1. Yellow: plane directors, catapult director, catapult officer, flight deck officer, arresting gear officer
2. Green: maintenance, catapult, and arresting personnel

*Sg 12, fr 1***SHIP'S BRIEF**

- * **Deck personnel**
- * Catapult procedures
- * Refueling/starting/shutdown
- * Normal departure procedures
- * Bingo procedures
- * Emergency/safety of flight
- * LSO calls/grades
- * Miscellaneous

Sg 12, fr 3**YELLOW SHIRT***Sg 12, fr 4***YELLOW SHIRT
AT WORK***Sg 12, fr 5***GREEN SHIRT***Sg 12, fr 6***GREEN SHIRT
AT WORK**

Sg 12, fr 7**BROWN SHIRT***Sg 12, fr 8***BROWN SHIRT
AT WORK***Sg 12, fr 9***BLUE SHIRT***Sg 12, fr 10***BLUE SHIRT
AT WORK***Sg 12, fr 11***PURPLE SHIRT***Sg 12, fr 12***PURPLE SHIRT
AT WORK**

3. Brown: plane captains
4. Blue: plane handlers (pushers, chockers, chainers, etc.), phone talkers, elevator operators
5. Purple: fueling crews

6. White: safety and medical personnel, LSOs, final checker, and Quality Assurance (QA)
7. Red: ordnance and crash crew

Sg 12, fr 13**WHITE SHIRT***Sg 12, fr 14***WHITE SHIRT
AT WORK***Sg 12, fr 15***RED SHIRT***Sg 12, fr 16***RED SHIRT
AT WORK**

Sg 12, fr 17**DECK PERSONNEL
SIGNALS (1-6)****B. Deck personnel signals to pilot and deck crew
9.7.2.4.6.1**

NOTE: The yellow shirt directs the following signals to pilots and/or deck crews. Signals performed above the waist are directed to pilots; signals performed below the waist are directed to deck crews.

1. Move ahead
2. Slow down
3. Turn left
4. Turn right
5. Proceed to next director
6. Stop
7. Emergency stop
8. Brakes off
9. Move back (push back)
10. Install chocks
11. Install tiedowns
12. Tiedowns installed/chocks installed
13. Remove chocks
14. Remove chain tiedowns (breakdown)
15. Chocks and chains removed

Sg 12, fr 18**DECK PERSONNEL
SIGNALS (7-12)***Sg 12, fr 19***DECK PERSONNEL
SIGNALS (13-15)**

16. Engage nosewheel steering
 17. Disengage nosewheel steering
 18. Open canopy
 19. Lights on/off
 20. Fuel top off
 21. Engine shutdown
- C. Pilot signals to deck personnel
1. Fuel status
 2. Fuel quantity signal
 3. Cut fuel
 4. Brake failure
- D. Catapult director/officer signals **9.7.2.5.2.1.1**
- NOTE: Take off checklist should be complete prior to passing JBD and roger the weight board.
1. Extend launch bar
 2. Engage nosewheel steering
 3. Taxi (move ahead)
 4. Slight turn left/right
 5. Brakes on (when in holdback)
 6. Tension
 7. Retract launch bar

Sg 12, fr 20**DECK PERSONNEL
SIGNALS (16-21)***Sg 12, fr 21***PILOT SIGNALS (1-3)***Sg 12, fr 22***CATAPULT DIRECTOR
SIGNALS (1-2)***Sg 12, fr 23***CATAPULT DIRECTOR
SIGNALS (3-7)**

Sg 12, fr 24**CATAPULT OFFICER
SIGNALS (8-10)*****Sg 12, fr 25***

NOTE: This video includes hand signals that are not discussed at this point.

**CATAPULT OFFICER
SIGNALS (11-14)**

8. Engine runup
9. Acknowledge salute
10. Launch signal
11. Suspend
12. Hang fire
13. Launch bar up
14. Throttle back

XIII. Catapult procedures 9.7.2.5.1.1, 9.7.2.5.2.1**A. Catapult hook-up**

1. Watch the director
2. Taxi slowly
3. Extend launch bar when directed

NOTE: Ensure takeoff checklist is completed and a correct weight board has been "Rogerred" prior to extending the launch bar.

4. Use high-gain NWS only when directed (+/-20 degrees; low gain not available)
5. Brake as directed
6. Taxi slowly into holdback - avoid push back

B. Tension/launch 9.7.2.5.2.1

1. MRT
2. Wipe out controls (including rudder)
3. Check instruments
4. Retract launch bar (>=90%)

WARNING: Selecting launch bar RETRACT before receiving the retract signal from the aircraft director may raise the launch bar before it is properly seated in the shuttle spreader assembly, resulting in a mispositioned launch bar.

5. Heels on deck, toes positioned below **Toe Bars** - **OFF BRAKES!**
6. Salute Cat Officer

*Sg 13, fr 1***SHIP'S BRIEF**

- * Deck personnel
- * **Catapult procedures**
- * Refueling/starting/shutdown
- * Normal departure procedures
- * Bingo procedures
- * Emergency/safety of flight
- * LSO calls/grades
- * Miscellaneous

Sg 13, fr 2**TAXI TO CATAPULT***Sg 13, fr 3***CATAPULT HOOK-UP***Sg 13, fr 4***CAT LAUNCH***Sg 13, fr 4, p1***PEDAL TOE BAR**



C. Catapult techniques

1. Hold stick lightly - allow it to come back aft during the stroke, then set 8-10 degrees attitude as aircraft becomes airborne
2. Scan ADI, AOA, airspeed. Do not over or under rotate. Elevator trim will rotate the aircraft to the proper climbing attitude. AOA will initially be approximately 19 units but will accelerate to 17 units quickly. Check heading, BRC, airspeed, and interval. Lower hook if required

D. Suspend 9.8.1.11.1

1. Prior to salute - shake head "no" and broadcast "Suspend, suspend!" (Keep hands below canopy rails)
2. After salute - same, but be ready to go
3. Remain at MRT until Cat Officer moves in front of aircraft with "throttle back" signal

WARNING: Do not throttle back until the catapult officer walks in front of the aircraft and gives the throttle back signal.

E. Catapult malfunctions 9.8.1.15.1

1. Cold/soft shot
2. Broken holdback
3. Hang fire
4. Launch bar failure

XIV. Refueling/starting/shutdown 9.7.2.4.3, 9.7.2.4.4, 9.7.2.4.5.1, 9.7.2.4.4.1

A. Refueling procedures

1. Locations - normally next to the island
2. Chocked/chained
3. Canopy closed
4. Purple shirt refueling signals
5. Cut signal at 3,000 lbs (or as directed by Air Boss)
6. Call, "Side number, up and ready (gross weight)"
7. Mask on prior to being broken down/ejection seat armed
8. Complete takeoff checklist prior to crossing JBD

B. Cold start/flight deck

1. Location of aircraft (obtained from flight deck control; escort required)
2. Preflight - same as before (Tail may be over deck edge. CAUTION!)
3. Beware of intakes, exhausts, and props!
4. Avoid landing area if ops in progress
5. Same start, checks, (anti-skid - off) - plane captains from home base will start you
6. No hook check of tail over water until aircraft pulls forward
7. Call, "Side number, up and ready, gross weight"

Sg 14, fr 1

SHIP'S BRIEF

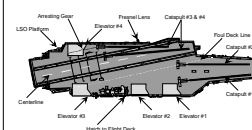
- * Deck personnel
- * Catapult procedures
- * **Refueling/starting/shutdown**
- * Normal departure procedures
- * Bingo procedures
- * Emergency/safety of flight
- * LSO calls/grades
- * Miscellaneous

Sg 14, fr 2



REFUELING

Sg 14, fr 3



**CARRIER DECK
ARRANGEMENT - USS
KITTY HAWK**



8. Complete takeoff checklist prior to taxiing

- a. Oxygen mask on
- b. Brake checks

C. Hot switches

NOTE: The plane captain is responsible for ensuring that the FOD safety screen is installed over the left engine intake prior to the occurrence of hot seat procedures.

- 1. Aircraft chocked and chained
- 2. Seat safed and parking brake set
- 3. Throttle friction on
- 4. Leave all electrical equipment on
- 5. Unstrap, lengthen lap straps, seat up and rudder pedals outward
- 6. Open canopy on signal, ensure intake screen in place
- 7. Debrief oncoming pilot
- 8. Oncoming pilot expeditiously enters/closes canopy, then takes time with checklists

CAUTION: The outgoing pilot must be escorted to flight deck control.

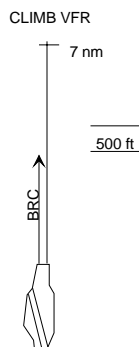
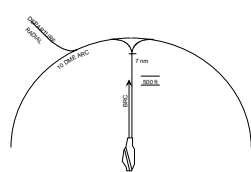
D. Shutdown

1. Follow yellow shirt's signals to parking area
2. When yellow shirt signals, blue shirts will tie down aircraft
 - a. Set parking brake ON

NOTE: The yellow shirt will signal the pilot when the aircraft is fully chocked and chained down.
 - b. Complete postlanding checklist
3. Shut down engine only when signaled by yellow shirt/brown-shirted plane captain

*Sg 15, fr 1***SHIP'S BRIEF**

- * Deck personnel
- * Catapult procedures
- * Refueling/starting/shutdown
- * **Normal departure procedures**
- * Bingo procedures
- * Emergency/safety of flight
- * LSO calls/grades
- * Miscellaneous

Sg 15, fr 2**CASE I DEPARTURE***Sg 15, fr 3***CASE II DEPARTURE****XV. Normal departure procedures****A. Case I 9.7.2.1.2.1**

1. Clean up, straight ahead (parallel BRC) at 500 ft to 7 nm at 300 KIAS or as directed by tower
2. Turn shortest direction to field and climb. Stay away from overhead marshal stack (outside of 10 nm)
3. Contact departure when directed
4. Once in contact with approach ("Sweet lock, sweet comm") check out with departure

B. Case II 9.7.2.1.2.2

1. Straight ahead at 500 ft to 7 nm at 300 KIAS or as directed by departure
2. At 7 nm, turn in appropriate direction onto the 10 nm arc and intercept the departure radial outbound
3. If joining other aircraft, execute TACAN rendezvous (VFR on top) on departure radial at a distance of angels plus 15 miles
4. All aircraft shall report airborne, arcing, and outbound. Remain VMC established outbound on departure radial
5. Once in contact with approach ("Sweet lock, sweet comm") check out with departure

C. Full stop ashore

1. Complete landing checklist
 - a. Ensure hook UP
 - b. Ensure anti-skid ON
 - c. Ensure anti-collision light ON

2. Use caution when braking with carrier pressurization
3. Take a full landing roll-out

*Sg 16, fr 1***SHIP'S BRIEF**

- * Deck personnel
- * Catapult procedures
- * Refueling/starting/shutdown
- * Normal departure procedures
- * **Bingo procedures**
- * Emergency/safety of flight
- * LSO calls/grades
- * Miscellaneous

Sg 16, fr 2

**SAMPLE
BINGO**
GEAR UP - FLAPS UP
ZERO FUEL WEIGHT - 15,000 lb

MAXIMUM RANGE CRUISE									
DIST TO BASE	FUEL REQ'D	TIME REQ'D	CLIMB		CRUISE		DESCEND		DIST
			SPEED	ALT	SPEED	SPEED	SPEED	DIST	
NM	LB	MIN	KCAS	FEET	KCAS	NM	KCAS	NM	
25	421	7		5,000	217	.36			14
50	829	13		10,000	219	.40			27
75	1,246	19		15,000	217	.43			40
100	1,714	24	300	20,000	217	.46			54
125	2,196	29	300	25,000	223	.54	180	67	
150	2,711	33	375	30,000	220	.59			80
175	3,238	37	35,000	218	.65				93
200	3,802	41	35,000	218	.65				93
225	4,366	45	35,000	218	.65				93
250	4,928	48	40,000	211	.71				107

XVI. Bingo procedures 9.8.2.2.1, 9.8.2.2.1.1, 9.8.2.2.2, 9.8.2.2.2.1

NOTE: While CQ is in progress, there will be a lead safe overhead with enough fuel to escort the remaining SNPs back to home base on the designated bingo profile. Tower updates "pigeons" information which refers to bearing and range to the bingo field. The lead safe will "hawk" any low state SNPs and, if the SNP does not trap, will join on the SNP and provide escort to the bingo field.

A. Be prepared to bingo

1. Know available bingo fields
2. Know dirty/clean profiles
3. Update bingo info (write it down)

B. Procedures

1. Notify tower when at bingo - don't wait to be asked.
This is an Emergency Procedure!
2. Turn to bingo heading (check compass)
3. Cleanup - including hook
4. Accelerate to bingo profile airspeed
5. Commence MRT climb to predetermined altitude (as per PCL Bingo Chart)

C. Once established

1. Switch to departure and tune in bingo TACAN.
Squawk 7700
2. Don't wait for safety pilot to join
3. Go IMC if necessary to preserve profile
4. Coordinate with Approach Control (emergency fuel - "20 minutes")

D. Recovery

1. Downwind or base leg entry, VFR straight-in, min fuel GCA
2. Heads up for other aircraft
3. Land on speed

*Sg 17, fr 1***SHIP'S BRIEF**

- * Deck personnel
- * Catapult procedures
- * Refueling/starting/shutdown
- * Normal departure procedures
- * Bingo procedures
- * **Emergency/safety of flight**
- * LSO calls/grades
- * Miscellaneous

XVII. Emergency/safety of flight**A. Communication failure (NORDO)**

1. En route - hand signals - expect section approach
2. In pattern **9.8.2.1.1**
 - a. Fly normal pattern
 - b. Cut lights - "Roger ball" / "Power"
 - c. No cut lights - waveoff up landing area, rocking wings
 - d. Rock your wings, clean up, climb to 500 ft; accelerate to 230 KIAS, turn left at 5 DME, stay within 5 DME; a lead safe will join on you
 - e. If bingo fuel - BINGO! (Squawk Emergency)
3. On deck **9.8.1.16.1**

B. Safety of flight 1.8.1.11

1. Loss of NAVAIDS
2. Lost plane
3. Lost sight/inadvertent IMC
4. Down plane/SAR
5. Bird strike
6. Midair

C. On deck

1. Blown tire **9.8.1.17.1**
 - a. Airborne - dirty bingo/TRAP
 - b. On deck - taxi/tow

2. Nosewheel steering failure - stop aircraft **9.8.1.12.1**
3. Brake failure **9.8.1.13.1**
4. Launch bar light/launch bar down airborne
9.8.1.14.1, 9.8.1.14.2
 - a. Get confirmation
 - b. Expect dirty bingo
5. Catapult emergency **9.8.1.15.1**
 - a. ACCEL light
 - b. Hang fire
 - c. Suspend
 - d. Holdback failure
 - e. Cold/soft cat
 - f. Launch bar failure
 - g. Flameout
6. Landing gear malfunctions; probable steer
7. Hydraulic failure - dirty bingo
8. Low altitude ejection (clean and dirty)
 - a. Over water
 - b. Water survival
 - c. Helo rescue
9. Short-field arrestment

*Sg 18, fr 1***SHIP'S BRIEF**

- * Deck personnel
- * Catapult procedures
- * Refueling/starting/shutdown
- * Normal departure procedures
- * Bingo procedures
- * Emergency/safety of flight
- * **LSO calls/grades**
- * Miscellaneous

Sg 18, fr 2

LSO

XVIII.LSO calls/grades**A. LSO calls - identical to FCLP LSO calls**

1. Lineup - "right for lineup"
2. Inflection - "Power!" vs. "A little power"
3. "Wave off starboard side"

B. Grades

1. 2.40 required
 - a. 50% "--" and 50% "(OK)" = 2.5
 - b. $\nearrow B = 2.5$
 - c. WO (1.0) and $\rightarrow G$ (0.0) HURT
 - d. >2.40 with improving trend
2. 50% boarding rate (typical fleet B.R. = 90%)
3. Just fly solid fair passes...the OK's will come

XIX. Miscellaneous

- A. Yellowsheets - "A" for ship ops; log traps, cats, T&G, bolter, field landing
- B. Hop isn't over after last trap. (Final cat shot, formation, field landing etc.); ensure hookup after final CAT
- C. Reputation is earned around the ship - be professional and alert!
- D. BE THE BALL!

Sg 19, fr 1**SHIP'S BRIEF**

- * Deck personnel
- * Catapult procedures
- * Refueling/starting/shutdown
- * Normal departure procedures
- * Bingo procedures
- * Emergency/safety of flight
- * LSO calls/grades
- * **Miscellaneous**

Sg 19, fr 2

The form is a 'DETACHMENT YELLOW SHEET' used for recording flight data. It includes sections for 'Flights' (with columns for 'Flights', 'Time', 'Status', 'Remarks'), 'Landing' (with columns for 'Landing', 'Time', 'Status', 'Remarks'), and 'Catapult' (with columns for 'Catapult', 'Time', 'Status', 'Remarks'). There are also checkboxes for 'Flights', 'Landing', and 'Catapult'.

**DETACHMENT
YELLOW SHEET**

*Sg 23, fr 1***SHIP'S BRIEF
REVIEW OPTIONS**

- A. Entire lesson
- B. Administrative/
general
information
- C. Preflight
- D. Carrier marshal
pattern
- E. Approaches to the
ship
- F. Carrier pattern/
landing
procedures
- G. Deck procedures
- H. Deck personnel
- I. Catapult
procedures
- J. Refueling/starting/
shutdown
- K. Normal departure
procedures
- L. Bingo procedures
- M. LSO calls/grades
- N. Miscellaneous
- O. End this lesson

Please select

SUMMARY

This lesson covered the following topics:

- * Ship's brief review
- * Administrative and general information
- * Brief
- * Preflight
- * Ground procedures
- * Takeoff/en route
- * Carrier marshal pattern
- * Approaches to the ship
- * Carrier pattern
- * Deck procedures
- * Deck personnel
- * Catapult procedures
- * Refueling/start/shutdown
- * Normal departure procedure
- * Bingo procedures
- * Emergency/safety of flight
- * LSO calls/grades
- * Miscellaneous

CONCLUSION

Your understanding of CQ procedures cannot be stressed enough. The procedures you have learned here are exactly the same as those you will use in the fleet. You are now prepared to perform your carrier qualification flight to the ship.

FLIGHT SUPPORT LECTURE GUIDE

COURSE/STAGE: IUT / Carrier Qualification

LESSON TITLE: CAR QUAL/Lead Safe Procedures

LESSON IDENTIFIER: T-45 IUT CQFP-02

LEARNING ENVIRONMENT: Classroom

ALLOTTED LESSON TIME: 1.5 hr

TRAINING AIDS: None

STUDY RESOURCES:

- * [T-45 NATOPS Flight Manual](#), A1-T45AB-NFM-000 or [A1-T45AC-NFM-000](#)
- * [CV NATOPS Manual](#)
- * [LSO NATOPS Manual](#), NAVAIR 00-80T-104
- * In-Flight Guide, TRAWING Two
- * [T-45](#) Carrier Qualification FTI

LESSON PREPARATION:

Study:

- * Part III, "Normal Procedures," Part IV, "Flight Characteristics," and Part XI, "Performance Data," [T-45 NATOPS Flight Manual](#), A1-T45AB-NFM-000 or [A1-T45AC-NFM-000](#)
- * "Fresnel Lens Optical Landing System," "Field Carrier Landing Practice (FCLP)," and "Glossary of Terms," [T-45](#) Carrier Qualification FTI

(7-01) ORIGINAL

REINFORCEMENT:

Review:

- * Chapter 8, "Carrier-Based Procedures," [T-45 NATOPS Flight Manual](#), A1-T45AB-NFM-000 or [A1-T45AC-NFM-000](#)
- * Section IV, "Launching Aircraft," and Section V, "Recovering Aircraft," [CV NATOPS Manual](#)
- * Chapter 6, "Shipboard Procedures," [LSO NATOPS Manual](#), NAVAIR 00-80T-104

Study:

- * "Carrier Qualification," [T-45](#) Carrier Qualification FTI

EXAMINATION:

The objectives in this lesson will be tested in IUT CQFP-04X.

LESSON OBJECTIVES**29.7.3.2**

Receive lead safe procedures overview

29.7.3.3

Recall lead safe requirements (# overhead)

29.7.1.2

Recall FCLP currency requirements

29.7.1.6

Recall CNATRA CV weather limits

29.7.3.6

Recall SNA limitations

29.7.3.4

Recall IUT/lead safe limitations

29.1.1.1

Recall Carrier Qualification briefing requirements

29.4.1.1

Review ground procedures

29.7.2.1.3

Review marshal check-in procedures

29.7.2.1.1

Interpret marshal procedures (Case I)

29.7.2.1.2

Interpret marshal procedures (Case II)

29.7.2.6.1

Recall procedures/techniques for CV pattern entry

29.7.2.6.2

Recall procedures/techniques for the carrier pattern

LESSON OBJECTIVES (Cont.)**29.7.3.5**

Recall lead safe overhead procedures

29.8.1.1

Recall emergency/escort procedures

29.8.2.2.1.1

Recall procedures/techniques for flying a bingo profile (clean)

29.8.2.2.2.1

Recall procedures/techniques for flying a bingo profile (dirty)

29.8.2.2.1

Compute a bingo profile (clean)

29.8.2.2.2

Compute a bingo profile (dirty)

29.8.1.17.1

Recall procedures/techniques for blown tire

MOTIVATION

Carrier pilots are the best because they must be the best: the carrier environment will not tolerate anything less. The carrier environment in the TRACOM is no different. Successful and safe operations in and around the carrier wholly depend on a coordinated team effort in which all team members do their jobs properly. There is no excuse for not knowing and using correct procedures around the ship, and there are no exceptions to this rule. As a CQ lead safe, you must ensure that your students have a thorough knowledge of the carrier environment. You must also be prepared to assist the ship and help the students for safe carrier qualifications.

OVERVIEW

After this lesson, you will know the procedures for briefing, leading, and acting as a lead safe overhead the ship.

This lesson covers technical data and the following carrier qualification procedures:

- * Overview
- * Administrative/general information
- * Brief
- * Ground procedures
- * Takeoff/en route
- * Marshal/carrier pattern procedures
- * Overhead procedures
- * Emergency/escort procedures

*Sg 1, fr 1***LEAD SAFE
PROCEDURES**

- * **Overview**
- * Administrative/
general information
- * Brief
- * Ground procedures
- * Takeoff/en route
- * Marshal/carrier
pattern procedures
- * Overhead
procedures
- * Emergency/escort
procedures

PRESENTATION**I. Overview 29.7.3.2**

- A. Administrative/general information
- B. Brief
- C. Ground procedures
- D. Takeoff/en route
- E. Marshal/carrier pattern procedures
- F. Overhead procedures
- G. Emergency/escort procedures

II. Administrative/general information **29.7.3.3**

A. Number of lead safes required

1. Weather RECCE first launch
2. 1-3 SNA: One lead safe required
3. 4-6 SNA: Two lead safes required
4. Late safe to arrive overhead 15 to 45 minutes after first scheduled student ramp time

B. FCLP Currency **29.7.1.2**

1. SNA: 2 days from FCLP or carrier arrestment/touch-and-go
2. Non-fleet experienced IUT/SERGRAD: FCLP within 3 days of CQ
3. IUT: FCLP within 5 days of CQ
4. Lead safe: FCLP within 10 days of CQ
 - a. 1-59 days since last trap: 1 arrested landing
 - b. 60 or more days: 4 landings, two of which shall be arrested
 - c. More than 12 months: Initial qualification requirements

C. Weather **29.7.1.6**

1. Case I: 3,000/5
2. Case II: 1,500/5 (waiverable to no lower than 1,000/5), tops not above 15,000 ft
3. Departure: VFR for SNA, IFR for IUT/LS
4. Enroute VFR on top (below 15,000) for SNA, IFR for IUT/LS

Sg 2, fr 1

LEAD SAFE PROCEDURES

- * Overview
- * **Administrative/general information**
- * Brief
- * Ground procedures
- * Takeoff/en route
- * Marshal/carrier pattern procedures
- * Overhead procedures
- * Emergency/escort procedures

Sg 2, fr 2

CARRIER LANDING REQUIREMENTS

	TAG TRAP	FCLP CURRENCY
SNA	4/10	2 DAYS
IUT	2/6	5 DAYS
SERGRAD	2/6	3 DAYS
LSO IUT	3/10	5 DAYS
LEAD SAFE/LSO CURRENCY	-1	10 DAYS (NOTE 1)
LEAD SAFE/LSO REFRESH	2/2	10 DAYS (NOTE 2)

NOTE 1: TRAP WITHIN LAST 59 DAYS FOR CURRENCY
NOTE 2: PILOT MUST REFRESH IF NO TRAP WITHIN LAST 59 DAYS

Sg 2, fr 3

CNATRA WEATHER LIMITS

DEPARTURE	EN ROUTE	CV	BINGO	DIVERT
SNA	VFR	VFR ON TOP	1,500/5	VFR
IUT, I/S	IFR	(BELOW 15,000)	(4) 15	IFR
		IFR	7000	IFR

NOTES:
(1) WAIVERABLE TO 5000 BY CO DET OIC
(2) A DEPARTURE HORIZON IS REQUIRED FOR STUDENTS
(3) WAIVERABLE TO 1,000/5 BY CV COMMANDING OFFICER
(4) NOT LESS THAN TACAN CIRCULAR MINS

5. Bingo: VFR for SNA, TACAN circling mins for IUT/LS

6. Divert: IFR

7. A definite horizon is required for student CQ

D. Limitations **29.7.3.6, 29.7.3.4**

1. SNA:

- a. 6 arrested landings
- b. 3.5 hours per flight, not to exceed 6.5 hours per day
- c. 2 flights/3 man-ups per day
- d. 10 hours crew rest aboard CV

2. IUT/Lead Safe

- a. IUT: 10 arrested landings. Lead safe: no limit
- b. 6.5 hours per day (OPNAVINST 3710.7)

III. Brief 29.1.1.1

A. Brief time

1. 2.5 hours prior to takeoff for first brief
2. 2.0 hours prior thereafter

B. Content

1. Concentrate on flight specifics
2. Course rules
3. Ship's position/NAVAIDS
4. Call sign/line up
5. Walk, man-up, takeoff and overhead times
6. Weather
7. Fuel requirements/management
8. Communications plan
9. Don't preach ball flying techniques
10. Don't repeat Ship's Brief lecture

Sg 3, fr 1

LEAD SAFE PROCEDURES

- * Overview
- * Administrative/
general information
- * **Brief**
- * Ground procedures
- * Takeoff/en route
- * Marshal/carrier
pattern procedures
- * Overhead
procedures
- * Emergency/escort
procedures

*Sg 4, fr 1***LEAD SAFE
PROCEDURES**

- * Overview
- * Administrative/
general information
- * Brief
- * **Ground
procedures**
- * Takeoff/en route
- * Marshal/carrier
pattern procedures
- * Overhead
procedures
- * Emergency/escort
procedures

IV. Ground procedures 29.4.1.1

- A. Marshal in line or in designated marshal area
- B. Check channelization/comm sequence
- C. Common lead safe tactical frequency
- D. Taxi: 300 ft centerline taxi
- E. Make takeoff times. Any fallouts go with late safe

V. Takeoff/en route

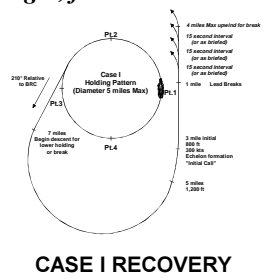
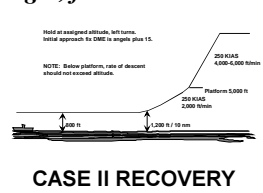
- A. Takeoff and departure - IFR/VFR clearance/rendezvous (be specific)
 - 1. Flight leaders are prohibited from leading a division formation into IMC conditions with students as wingmen except in emergency situations
- B. En route to ship - loose cruise. Shuffle wingman sides for extended holding periods
- C. Feet wet checks (check wingmen's lights off)
 - 1. Anti-collision light - OFF
 - 2. Anti-skid - OFF
 - 3. Hook bypass switch - either
- D. Check in with Marshal **29.7.2.1.3**
 - 1. Lineup/qual numbers
 - 2. Low state
 - 3. Position and "Angels"
- E. Monitor fuel states

Sg 5, fr 1**LEAD SAFE
PROCEDURES**

- * Overview
- * Administrative/
general information
- * Brief
- * Ground procedures
- * **Takeoff/en route**
- * Marshal/carrier
pattern procedures
- * Overhead
procedures
- * Emergency/escort
procedures

*Sg 6, fr 1***LEAD SAFE
PROCEDURES**

- * Overview
- * Administrative/
general information
- * Brief
- * Ground procedures
- * Takeoff/en route
- * **Marshal/carrier
pattern procedures**
- * Overhead
procedures
- * Emergency/escort
procedures

Sg 6, fr 2*Sg 6, fr 3***VI. Marshal/carrier pattern procedures****A. Case I 29.7.2.1.1**

1. Level at assigned altitude by 10 nm
2. Enter left-hand pattern (flight in balanced formation)
3. Max conserve airspeed
4. Update low state every 15 minutes
5. Pattern entry
 - a. Descend from holding abeam ship or aft on 210 relative heading
 - b. Be at 1,200 ft at 7 nm
 - c. Initial 800 ft at 3 nm; call "3 miles" or "Initial"
 - d. Airspeed 300 KIAS max
6. Spin
 - a. Initiate as directed or when pattern is full
 - b. Initiate at the bow, try to use no more than 30-degree AOB
 - c. 1,200 ft, 300 KIAS, remain within 3 nm; call "Spin 90"

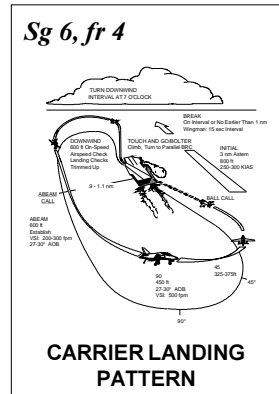
B. Case II 29.7.2.1.2

1. Proceed to marshal pattern as instructed
2. Drop off wingmen from high to low in holding pattern
3. Max conserve airspeed - 230 KIAS
4. Stay with dash-2 for section approach

5. Anticipate late safe escorting dash-3 and lead returning for dash-4
6. Keep track of own and wingmen's fuel
7. Fly CV-1 approach
8. If not VFR or ship is not in sight at 800 ft and 5 nm, climb straight ahead on the BRC to visual conditions on top
9. Ship in sight - call "see you" and switch tower. Enter normal break 800 ft, 300 KIAS

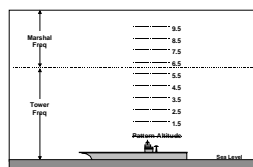
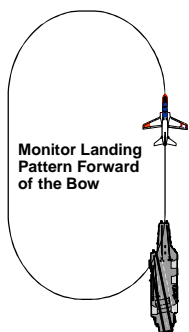
C. Break **29.7.2.6.1, 29.7.2.6.2**

1. 300 KIAS MAX!!
2. Lead breaks on interval or not earlier than 1 nm past bow
3. Wingmen break at 15-second intervals
4. Report abeam with qual number
5. Call abeam with distance to wingmen and instruct to deselect Comm 2
6. Anticipate touch-and-go, clean up, depart and hold overhead as instructed



*Sg 7, fr 1***LEAD SAFE
PROCEDURES**

- * Overview
- * Administrative/
general information
- * Brief
- * Ground procedures
- * Takeoff/en route
- * Marshal/carrier
pattern procedures
- * **Overhead
procedures**
- * Emergency/escort
procedures

Sg 7, fr 2**CNATRA CQ CASE I
STACK***Sg 7, fr 3***CASE I LEAD SAFE
OVERHEAD PATTERN****VII. Overhead Procedures 29.7.3.5**

- A. At assigned altitude (may be 2 lead safes at one altitude for weather)
- B. Max conserve
- C. Manage landing pattern forward of the bow
 1. Watch for aircraft cutting out interval
 2. Call for aircraft to turn downwind, but don't fly the student's pattern for them
- D. Update fuel to tower every 15 minutes
 1. You can no longer lead safe once you hit student BINGO
 2. Stack will usually move down when bottom AC called down for fuel
- E. Last overhead of the day anticipate RON

VIII. Emergency/escort procedures 29.8.1.1

- A. Be proactive with student problems in the pattern and on deck
- B. Be prepared to hawk low state/emergency aircraft
- C. System failure
 1. Give student option of the lead
 2. Back up PCL procedures and make recommendations
 3. Coordinate comm
 4. Be directive if needed
 5. Have SNA squawk emergency if required
- D. Bingo 29.8.2.2.1.1, 29.8.2.2.2.1, 29.8.2.2.1, 29.8.2.2.2
 1. Get SNA turned to bingo field and accelerating. Watch climbs through the overhead stack
 2. Brief profile to SNA
 3. Coordinate comm
 4. Be directive if needed
 5. Have SNA squawk emergency
 6. Be sure to “game” fuel on-board remaining in minutes
 7. Set up for straight-in, downwind recovery, or low fuel GCA

Sg 8, fr 1

LEAD SAFE PROCEDURES

- * Overview
- * Administrative/general information
- * Brief
- * Ground procedures
- * Takeoff/en route
- * Marshal/carrier pattern procedures
- * Overhead procedures
- * **Emergency/escort procedures**

Sg 8, fr 2

SNA BINGO FUEL REQUIREMENTS		
Distance to Bingo Field (NM)	Climb	Clear Down
20	.7	.6
30	.7	.6
40	.8	.7
50	.9	.8
60	.9	.8
70	1.0	.9
80	1.0	1.0
90	1.1	1.0
100	1.2	1.0
110	1.2	1.1
120 (max)	1.3	1.1
130	1.3	1.2
140	1.4	1.2
150	1.5	1.2

NOTES:
 (1) These fuel figures based on 5000 reserve overhead bingo field.
 (2) Based on low level figures of 200 KTS.
 (3) Use NATOPS bingo profiles.
 (4) Clear down fuel figures are for 125 KTS at sea level.
 (5) Add 2000 for 90% or night.

Sg 8, fr 3

LEAD SAFE, IUT, LSO BINGO FUEL REQUIREMENTS		
Distance to Bingo Field (NM)	Climb	Clear Down
20	.4	.5
30	.5	.6
40	.6	.7
50	.6	.8
60	.7	.9
70	.7	1.0
80	.8	1.1
90	.8	1.2
100	.9	1.3
110	1.0	1.4
120 (max)	1.0	1.5
130	1.1	1.6
140	1.1	1.7
150	1.2	1.8

NOTE: These fuel figures based on 3000 reserve overhead bingo field.

8. Profile should give 550 lbs on deck
 - a. Fuel figures based on 250 KIAS at sea level.
Use NATOPS bingo profiles
 - b. Gear down figures are 135 KIAS at sea level
 - c. Increase bingo by 300 lbs for IFR or night
9. Be prepared to fuel and return overhead with SNA if CV requires

E. Blown tire **29.8.1.17.1**

1. Try to get CV arrestment
2. If divert, thoroughly brief short field arrestment procedures
3. Get LSO on station

SUMMARY

This lesson covered the following topics:

- * Overview
- * Administrative/general information
- * Brief
- * Ground procedures
- * Takeoff/en route
- * Marshal/carrier pattern procedures
- * Overhead procedures
- * Emergency/escort procedures

CONCLUSION

This lesson was intended to refresh your memory on the key aspects of carrier procedures. You should now have a good understanding of carrier procedures and be better able to help your students.

Sg 9, fr 1

**CAR QUAL/LEAD
SAFE PROCEDURES
REVIEW OPTIONS**

1. Entire lesson
2. Administrative/
general information
3. Marshal/carrier
pattern procedures
4. Overhead
procedures
5. Emergency/escort
procedures
6. End this lesson

Please select

NOTES